Business Sustainability for SMEs Operating in High-Cost Regions

Thesis submitted in accordance with the requirements of the University of Liverpool for the degree of Doctor of Business Administration by

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April 2021

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Abstract

Globalization has provided opportunities for Small and Medium-Sized Enterprises (SMEs) operating in high-cost regions. However, globalization also presents a risk to SME sustainability due to increased, worldwide competition. In an effort to reduce cost and grow their businesses, Multi-National Companies (MNCs) may decide to move their supply base to low-cost regions. SMEs in high-cost regions are therefore presented with a competitiveness challenge and how they address this challenge may define their sustainability. The aims of this study are to learn how SMEs select business sustainability approaches that successfully make it difficult for MNCs to transfer work from them and, also, identify why SMEs select specific approaches over other approaches, and how these approaches impact their ability to be financially sustainable. During the preparation of the thesis proposal, a preliminary literature review revealed that knowledge, resources, and innovation are relevant factors to SMEs' business sustainability. A conceptual model was created at the outset of the thesis work, presenting the relationships these factors and manufacturing business practices have on driving business sustainability. These factors then inspired the formulation of the research questions. This model was modified to include the seven factors (strategy, flexibility, cost reduction, knowledge, innovation, communication, and Supply Chain integration) identified through the systematic literature review, and then modified again to include the three essential practices (continuous improvement, lock-in, diversification) identified and influenced by the case studies field work. The methodology used during the study was the generation of a literature review, followed by a case study research approach. The literature review helped identify key factors that affect SMEs' business sustainability, and was used to craft the questionnaire used as a guideline during the case study interviews. The study was conducted in California, a high-cost region in the USA, and included visiting four companies, gaining consent for their participation in the research, interviewing four employees from the management team, including the highest-ranking person, and participating in a plant tour. Each company represents a case study. A questionnaire was designed and used to help

guide the researcher during the interview process using a semi-structured approach, providing the participants with the freedom to share their operations and business sustainability experiences while also ensuring a consistent approach with each participant and case. After the visit to each company, a case study was written to document the participants' perspectives and responses to the posted questions, followed by an analysis of how they approach business sustainability. Each case revealed similarities and differences between participants. Furthermore, when a cross-case analysis was performed, various common themes were observed, including tactics the SMEs used to remain competitive and approaches to business sustainability. SMEs' tactics to remain competitive concerned the use of Lean Manufacturing techniques and material cost reduction through bidding processes. From a business sustainability standpoint, the main approaches related to locking-in business were ensuring SMEs' active participation in customers' new designs, customizing products, and gaining design co-ownership. In addition, diversification into other markets and industries was a common theme discussed as a long-term approach to business sustainability. Another key point from the research was that supply chain integration and collaboration initiatives, such as product customization and engaging in supply chain programs like Vendor Management Inventory (VMI), provided the SMEs with a lock-in mechanism to ensure business sustainability in the long-term. The new trend of reshoring or back shoring shows that the same factors identified during the literature review, particularly cost reduction, flexibility, knowledge and supply chain integration, continue to be important when companies decide on a location. In addition, continuous improvement practices and customization capabilities were important to MNCs when they decided with whom to partner during the reshoring or back shoring process.

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Chapter 1 - Introduction

Small and Medium-sized Enterprises (SMEs) are defined as companies employing fewer than 250 people and with annual turnover not exceeding EUR 50M (European Commission, cited by Walker and Preuss, 2008, p. 1600). SMEs represent about 70% of employment worldwide (Brilius, 2010, p. 18; Ates and Bititci, 2011, p. 5601) and an estimated 99% of all businesses in Europe and the UK (Siakas et al., 2014, p. 332). In the last few decades, globalization has motivated Multi-National Companies (MNCs) to seek new markets and business expansion, resulting some MNCs moving their supply base to low-cost regions. SMEs in high-cost regions are therefore presented with a competitiveness challenge that threatens their business sustainability. Wiesmann et al. (2017, p. 15) propose that in the last decades, "globalization has changed the rules of competition in business" and that this has led to a major outsourcing trend driven by the need to improve efficiency and competitiveness.

SMEs' financial sustainability could be impacted by decisions made by multi-national companies, which in the last few decades have been moving manufacturing and sourcing activities to Low-Cost Regions (LCRs), therefore creating unemployment in High-Cost Regions (HCR). Tate's (2014, p. 66) research shows that over the last 40 years, manufacturing jobs have migrated from high-cost to low-cost countries. Brodd and Helou (2012, p. 293) estimated that the United States lost about 38% of their manufacturing base, mainly to China, and it is predicted that additional jobs will be lost to lower-cost alternative countries, which continue to build strong manufacturing economies. This is also confirmed by the study from Tate et al. (2013, p. 388) that proposed the phenomenon of offshoring to LCRs will continue as a consequence of a "firm's current competitive business strategy."

In the last 25 years, while working in management positions at Multi-National Companies (MNCs), the researcher has been actively involved in sourcing decisions, moving procurement of materials from SMEs located in High-Cost Regions (HCR) to suppliers in Low-Cost Regions (LCR). Ketokivi et al. (2017, p. 20) relate high cost regions with high

Gross Domestic Product per capita, which tends to positively correlate with factors such as wages. Also, the authors mention that the United States is among the examples of high-cost environments. The decisions to offshore work are influenced by the need to keep the MNC organization I work for competitive and to increase its profitability, as this is the expectation of the company's stockholders and top management. Zhai et al. (2016, p. 62) found that from 1980 to 2010, millions of manufacturing jobs were eliminated as a consequence of companies seeking to maximize their profit by optimizing the supply chain and utilizing lower labor cost in developing countries. There are SMEs operating in high cost regions which have proven to be resilient to the trend of outsourcing "by developing new products and more efficient production processes" (Radicic et al., 2016, p. 1429).

The Case Study research approach and the specific topic of business sustainability are new to the researcher, even though the researcher has interacted with SMEs directly and indirectly over the last 25 years while working for Multi-National Companies. This topic is important to investigate to better inform MNC supplier selection and retention decision-making and to explore how the key drivers of SMEs operating in HCRs support their sustainability. The results drawn from this study could enable SMEs to successfully become sustainable by informing them of better decisions and approaches to business sustainability that help them become resilient to decisions made by MNCs to source from LCR suppliers. The results could also inform MNCs' decision-makers influenced by the latest trend of reshoring or near shoring where to focus when attempting to develop SMEs in HCRs, provided the apparent wage cost advantages might be offset by other factors. Tate et al. (2013, p.381) studied 319 companies across many industries and found that 40% perceived a new trend of reshoring to the US. They also highlighted that there is a growing shortage of skilled employees in China, while the USA is known for their skilled labor and innovation (Tate et al., 2013, p. 384). These could be factors that help off-set the difference in labor cost when compared to LCR suppliers.

1.1 Key questions and objectives of the research study

There are three key questions that are the foundation of this research study:

- How do SMEs in high-cost regions approach business sustainability?
- How does management knowledge, resources and innovation impact the sustainability of SMEs in high-cost regions?
- Why do managers in SMEs in high-cost regions choose specific business sustainability approaches?

Bessant et al. (2005, p. 61) propose that there is a gap in the literature regarding the type of operational improvements that could be of value for SMEs. The authors describe how important to growth is the absorption of knowledge and the creation of solutions to overcome the tipping points. Phelps et al. (2007, p.10) share how formalization enables SMEs to better utilize their limited resources, allowing them to increase innovation and be more effective.

Much has been written on the reasons why MNCs move to low-cost regions (LCR), including maintaining profitability and increasing market share. In recent years, however, there has been a new trend of reshoring or near shoring for which many authors have made extensive studies to share what factors they believe are influencing the MNC sourcing or location decisions (Fratocchi et al., 2014; Tate, 2014; Bals et al., 2016; Foerstl et al., 2016; Di-Mauro et al., 2016; Signh-Srai and Ane, 2016; Stentoft et al., 2016; Zhai et al., 2016; Brandon-Jones et al., 2017; Gray et al., 2017; Wiesmann et al., 2017; Vanchan et al., 2018). Nevertheless, how SMEs' internal actions can influence MNCs' decisions are not clearly expressed in the literature. Foerstl et al. (2016, p. 502) write about reshoring and propose that intangible resources such as skill and knowledge can affect a company's commitments to offshoring and outsourcing. This reshoring new trend is an opportunity for SMEs in high-cost regions to consider how their resources, skills and knowledge could provide value to MNCs that are considering such strategies. This research attempts to fill this gap and provide a learning opportunity for SMEs that could be at risk of losing business to LCR manufacturers. The knowledge acquired from the

literature review combined with the learning from each case study will better inform the SMEs of alternatives they could employ to become more sustainable.

The literature review revealed many factors that are potential reasons for SMEs' sustainability; however, it was not evident which were the factors that contributed the most to their success. Thirty-two articles were selected as the most relevant to SMEs' business sustainability and focused on the financial health of SMEs. As an output of the literature review, a matrix was created to identify the factors considered to be most important in the selected articles. Sixty-six factors influencing sustainability were identified from the literature review and are summarized in Table 2, page 31-32. A subset of these 66 factors were selected based on the frequency they were mentioned in the articles, and these factors included strategy, supply chain integration, innovation, knowledge, flexibility, communication, and cost reduction. These seven factors were utilized to help formulate and organize the questions used to guide the Case Study interview process.

In addition to exploring how the seven key factors mentioned in the literature review affect business sustainability, the research study investigated the use of business sustainability programs typically practiced by Multi-National Corporations, including Lean Manufacturing, Six Sigma, Theory of Constraints, Value Analysis and Value Engineering, and Supply Chain Strategy.

The targeted companies for this research were manufacturing SMEs in HCRs. For the purpose of this research, the region of study was narrowed to the State of California due to travel distance and access to companies that operate in a HCR. A total of four SME manufacturing companies were studied. The study consisted of an interview process of four participants per company and a plant tour. A questionnaire consisting of two sections was used to guide the researcher during the interview process in a semi-structured approach, as it was important that the participants had the freedom to share additional information they thought was relevant to the discussion. In various instances, the participants would share details of their practices or ask questions during the interview process to expand on the discussion topic. The use of the semi-structured approach

helped the researcher to be consistent throughout the interview process. The first section of the questionnaire focused on operational effectiveness and the second section focused on business sustainability approaches. Each section contained a total of nine questions. The participants did not have access to the questionnaire prior to the interview, as it was intended to be used by the researcher as a standardized guide to create consistency during the face-to-face discussion. The participants included the highest-ranking management person of the company and three employees who report directly to the highest-ranking management person.

The main objectives of this research are to:

- Study how small and medium-sized enterprises (SMEs) select business sustainability approaches that successfully make it difficult for Multi-National Corporations (MNC) to transfer work from them.
- Learn why SMEs select specific approaches over other approaches, and how this impacts their ability to be financially sustainable.

Learning how SMEs approach business sustainability and why they choose specific sustainability approaches over others will help achieve the main objectives of understanding how their selection impacts their ability to be financially sustainable and how they prevent MNCs from moving work from them.

1.2 Thesis Report structure

The subsequent chapters include the Literature Review, the Methodology used during the research, the four Case Studies at four SME companies, the Discussion of the results, the Conclusions of the research, the Addendum section, and References to articles and books used during the study research process. Below is a short summary of the content of these chapters.

- Chapter 2, the Literature Review, revealed factors that were important to study to understand how they influence the ability of SMEs to become financially

sustainable. Some of the factors that appeared most frequently in the 32 articles studied were selected as the basis to craft the interview questionnaire. The systematic literature review spanned from prior to the Case Studies, to the period the Case Studies were being conducted, to post Case Study work. Articles include themes such as off-shoring, outsourcing, reshoring, and near shoring, as well as the most recent trends from the last decade related to MNC location decisions. This systematic review informed the research Conceptual Model as well as factors and practices important for SMEs' business sustainability.

- Chapter 3, the Methodology, explains the approach followed during the study, including a case-based approach where four SMEs with different types of products and market focus were studied. This Methodology included site visits and interviews with the company leader and three employees who directly report to the company leader. A semi-structured questionnaire was designed to ensure consistency and comprehensiveness during the interview process and provide freedom to the participants to share other thoughts they felt were relevant to the research. Below is a short summary of the process followed during the interview process.

  - Semi-structured interviews were conducted to allow as much liberty and freedom to the interviewees to express their experience and concerns related to financial business sustainability.
  - The researcher used various high-level questions to guide the thought process during the interview and ensure that the main objectives were achieved.
  - The researcher complemented the interviews with information provided by participants related to business performance during a tour of the facility.

  The research is based on a multi-case study approach. Meredith (1998, p. 452) recommends the amount of cases in a multi-case to be between two and eight, in order to support generalizability or external validity. However, the focus here is analytic generalization rather than statistical generalization as proposed by Yin

(2014, p. 42). The goal is to generalize from data to theory rather than to population (Farquhar, 2012, p. 104).

- Chapter 4, the Case Studies, provides an account of the field work completed. This included visiting four SMEs in California to conduct four interviews in each SME and a plant tour to observe any practices that support and corroborate their answers to questions on business sustainability practices. The Case Studies chapter is organized into four cases. Each case provides the participants' answers to questions related to the seven key factors, which are strategy, flexibility, cost management, knowledge, innovation, communication, and supply chain integration programs, including customization practices.

- Chapter 5, the Discussion, provides an analysis of how SMEs in HCRs attain business sustainability according to the case studies and the literature review. This chapter contrasts the practices followed by the four SME companies and summarizes the learning into a Cross Case Comparison Matrix. In addition, the three essential business sustainability practices observed at SMEs are presented, including Continuous Improvement, Lock-In, and Diversification practices.

- Chapter 6, the Conclusion, addresses the research questions and provides recommendations of what SMEs and MNCs should do to create business sustainability in SMEs operating in high-cost regions. Also, reflections about the learning and limitations of the research study are presented.

- The Appendix section consists of various documents and tables generated during the research study, including the Interview Questionnaire, the form used to collect participants' agreement to join the research study, and a list of articles reviewed.

- The Reference section provides references to articles and books' resources used during the research study.

Chapter 2- Literature Review

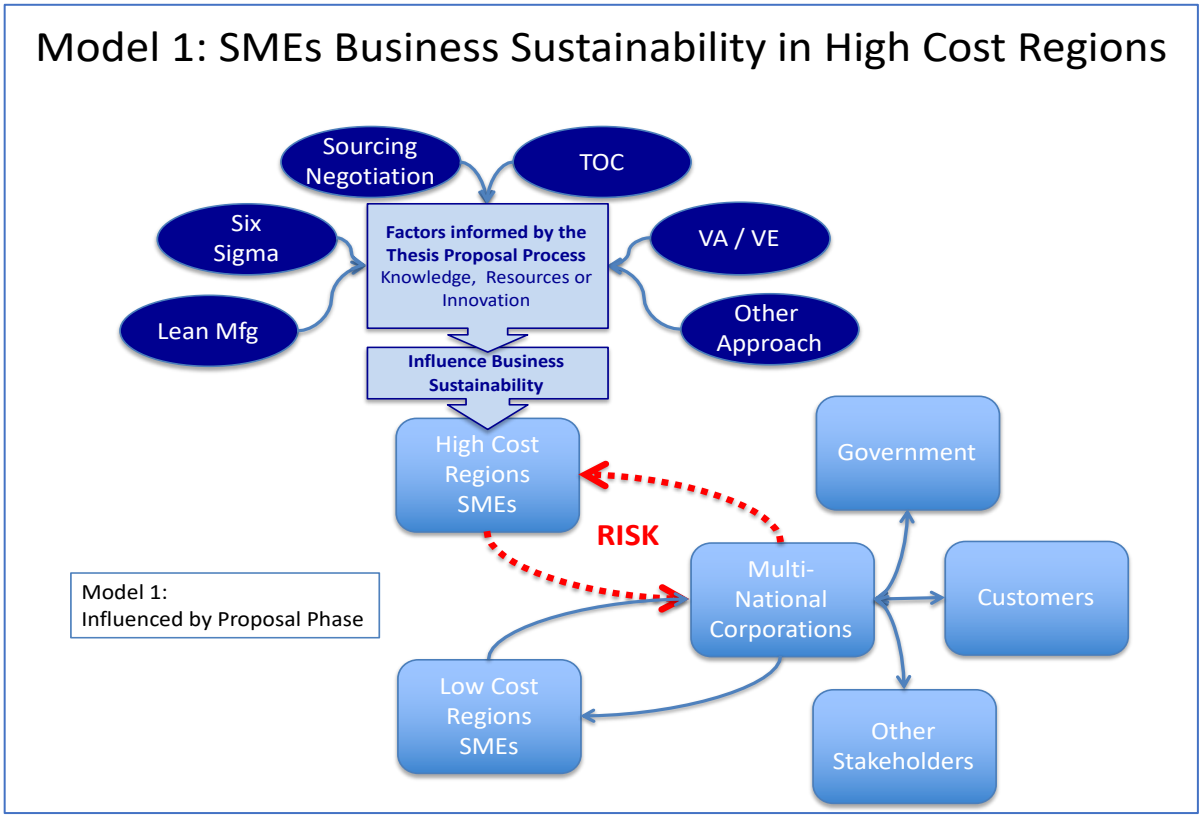
The literature review follows a systematic abductive approach to learning. It consists of articles studied throughout the thesis process, which help inform the key factors impacting business sustainability. This chapter is organized into the following sections.

- Section 2.1, page 13, includes the process followed in the selection of the relevant articles to the thesis study theme and the method used during the literature review. The articles selected during the literature review helped restructure the Conceptual Model with factors identified as key to SMEs business sustainability.
- Section 2.2, page 18, provides a systematic literature review summarizing the contributions of the articles that closely relates to SMEs business sustainability, including how small and medium-sized enterprises (SMEs) select business sustainability approaches and why SMEs select specific approaches over other approaches, and how this impacts their ability to be financially sustainable.
- Section 2.3, page 33, is a literature analysis, which illustrates how these articles contributed to the identification of factors that can impact SMEs' business sustainability. The seven key factors identified from these articles were used to develop the questionnaire used during the semi-structured interview.
- Section 2.4, page 38, shares the Theoretical Framework, including the Conceptual Model revised in light of the seven factors identified during the literature review. Here the model shows the seven key factors that later influenced the questions used in the interviews.
- Section 2.5, page 40, includes recent articles added to the literature review to assess if the factors identified in the initial literature review continue to be relevant today.
- Section 2.6, page 47, includes articles related to the new trend of reshoring, near shoring, and manufacturing location decisions, including back-shoring to high cost regions.
- Section 2.7, page 54, shows a model that summarizes the systematic abductive approach to literature review followed during the thesis process.

2.1 Articles selection process and initial Conceptual Model

The literature review section reviews, organizes, and synthesizes relevant reference material pertaining to business sustainability. It also helped to shape the research questions highlighted in the Introduction (Chapter 1, page 7). Rowley and Slack (2004, p. 31) define a literature review as "a summary of a subject field that supports the identification of specific research questions". The literature review revealed the factors that were explored during the research via the case studies questions. Prior to the outset of the thesis research, a literature review was performed to help ground the researcher in understanding which aspects were important for SMEs in high- cost regions and how these could inform the thesis work. During the analysis of these articles, various factors that seemed to be important for SMEs sustainability were identified including knowledge, resources, and innovation, which informed the research questions and the development of the initial conceptual model figure illustrated below.

Figure 1 – Factors and Practices influencing SMEs Business Sustainability (Model 1)



As it relates to knowledge, for example, Brilius (2010, p. 23) contrasts SMEs with large enterprises, pointing out some of the characteristics that dominate each one of these types of organization. He concluded that SMEs typically have "resources poverty, including constrained to capital, time, knowledge and skills" and they are focused on short- term gains, rather that mid to long-term sustainability. Samujh (2011, p. 16), who studied micro-businesses, propose that they are prone to failure because the people running the company lack the necessary business skills or do not have the learning opportunities to support the business.

As it relates to resources, Walker and Preuss (2008) agree with the point made by Battisti et al. (2013) that SMEs have a reactive approach to sustainability because they lack the human or financial resources. Battisti et al. (2013 p. 91) point out that SMEs respond in different ways as compared to large companies due to limited resources and capability for investment. Ates and Bititci's (2011, p. 5604) conclusion aligns with that of Brilius (2010, p. 5604) in that SMEs are focused on short-term concerns and have limited resources including time, financial and human aspects, and lack strategic long-term planning.

Regarding innovation, Rees and Wilson (2008, p.38) take an interesting angle to business sustainability for SMEs in New Zealand. They propose that design management can be a solution for SMEs. However, they are concerned that managers sometimes do not recognize the impact that short-term decisions have on long-term business goals. The focus of SMEs in delivering a single product or service, with a limited approach to innovation, can impact their ability to grow or to sustain the business. The author addresses the need for "interactive product innovation" to develop competitiveness (Rees and Wilson, 2008, p.38). Ates and Bititci's (2011, p. 5601) used case studies and semi-structured interviews in 37 SMEs in Europe and proposed that the ability of the SMEs to innovate to the customers' needs and manage change are key aspects to their success.

This literature review prework for the thesis proposal helped generate the initial Conceptual Model, centered on factors such as knowledge, resources, and innovation,

as illustrated below. It also influenced one of the research questions generated at the outset of the thesis: How does management knowledge, resources, and innovation impact the sustainability of SMEs in high-cost regions?

The importance of knowledge, specifically absorptive knowledge, the effective use of limited resources, and the need to increase innovation are highlighted by Phelps et al. (2007) as key factors at SMEs. The authors share the concept of absorptive capacity, which they describe as "the ability of an organization to absorb and use new knowledge" (Phelps et al., 2007, p. 1). Holt et al. (2007) also share the importance of knowledge in small firms and propose that the way knowledge is applied in these organizations can have an impact on their overall performance.

Holt et al. (2007, p. 47) propose that the value of an SME resides in its people, rather than other assets such as property-based, market-based, or financial assets, and that these knowledge resources are critical for businesses to grow in size and profitability. The authors conclude that SMEs performance is impacted by their owners' ability to understand the markets and implement ideas through innovation. Phelps et al. (2007, p. 11) suggest that managers in small firms recognize the need to embrace operational improvement practices due to productivity gaps and external pressures such as customers or competitors but might not adopt these practices due to cost, lack of information, no motivation, or indecision. Holt et al. (2007, p. 54) propose that when SMEs have access to new knowledge, whether from customers or suppliers, it could become a source of innovation.

The Conceptual Model will see various changes throughout the thesis as a consequence of the systematic literature review, which followed an abductive approach to learning. The Conceptual Model 2 was influenced by the factors learned during the literature review and the Conceptual Model 3 was influenced by the business sustainability practices learned during the Case Studies field work.

The articles selected for the thesis literature review were primarily published between 2006 and 2015. However, many of the articles reviewed made relevant references to other work that date back to the 1990s. The literature review was undertaken in the initial stage of the research process to understand the main documented contributions concerning business sustainability and identify those factors which influence SME business sustainability. The databases used during this research were Business Source Complete, Environment Complete, Science Citation Index, ScienceDirect, Scopus®, Social Sciences Citation Index, and SPORTDiscus with Full Text. During the initial search, terms such as "sustainability" and "resilience" were used in conjunction with the phrase "SME in high cost region" to identify articles that related to the area of research and the proposed thesis research questions.

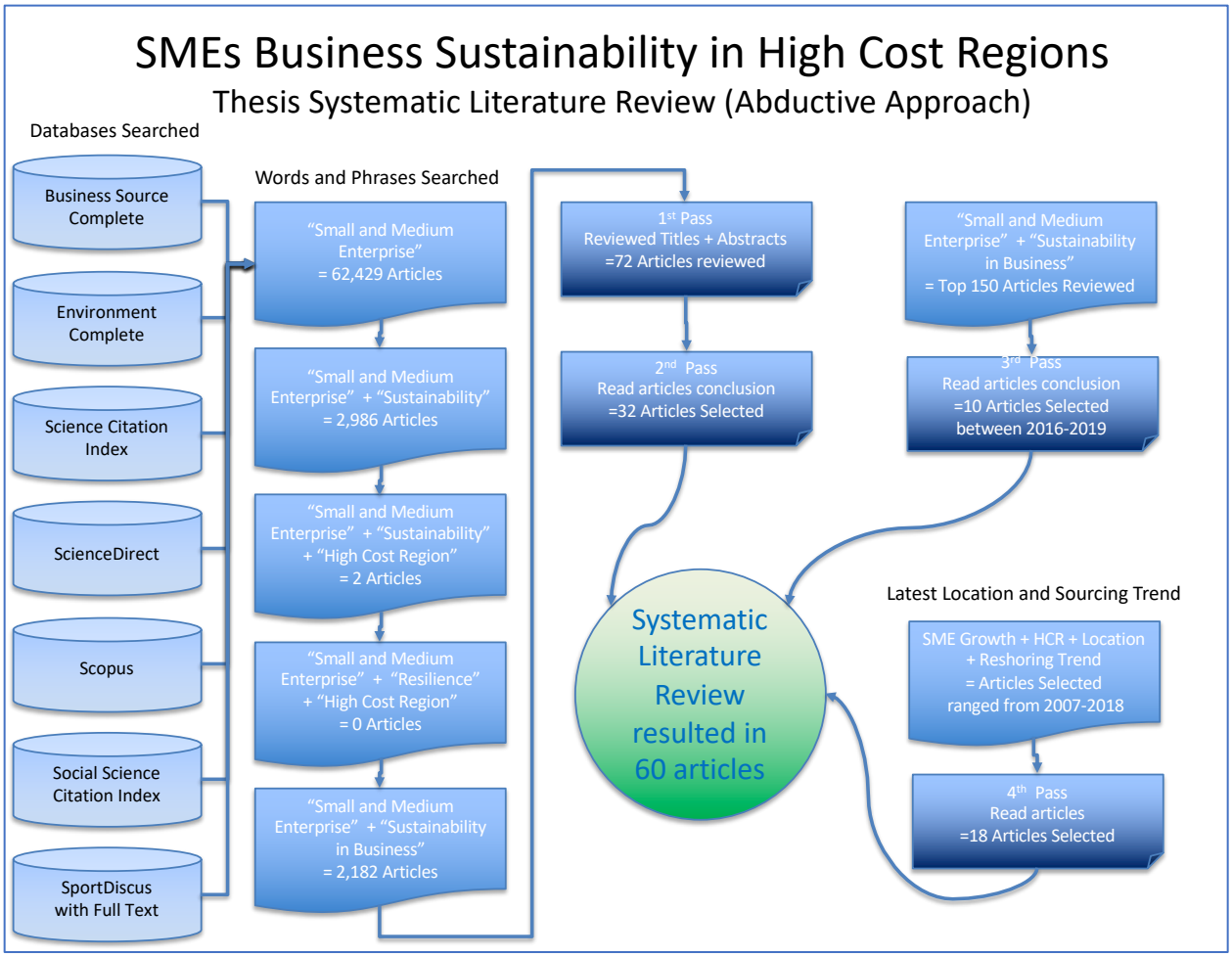
The first search using the phrase "Small and Medium Enterprise" yielded a total of 62,429 articles. To narrow the number of articles, the second search used "Small and Medium Enterprise" and "Sustainability". This resulted in 2,986 articles. The third search added the phrase "High Cost Region" to the previous two phrases, resulting in only two articles. It was evident that this third search was too restrictive. The fourth search replaced the term "Sustainability" with "Resilience", keeping "Small and Medium Enterprise" and "High Cost Region". This resulted in no article matching these criteria. The fifth search used the phrase "Small and Medium Enterprise" and "Sustainability in Business", resulting in 2,182 articles. To further narrow the list of articles for the research, the researcher reviewed the titles and abstracts of the articles, resulting in a total of 72 articles that seemed to be relevant to the thesis scope. A table summarizing the initial 72 articles selected is shown in the Appendix Chapter, Table A, pages 175-178. Further review of these articles showed that some of the articles were focused on environmental sustainability, which was outside of the scope of the research. A second review of the 2,182 articles resulted in a total of 32 articles which made direct reference to factors influencing business sustainability in SMEs.

Table 1 – Initial Literature Review Articles

ITEM #	Articles Authors, Title and Assigned #
1	Bhamra, R., Dani, S., Burnard, K. (2011) 'Resilience: the concept, a literature review and future directions' [Accessed: 14 March 2015] (Reference number 1 in matrix).
2	Demmer, W. A., Vickery, S. K. (2011) 'Engendering resilience in small- and medium-sized enterprises (SMEs): a case study of Demmer Corporation Calantone, Roger.', [Accessed: 14 March 2015] (Reference number 2 in matrix).
3	Li, H. J. K., Tan, K. H., Hida, A. (2011) 'Sustaining growth in electronic manufacturing sector: lessons from Japanese mid-size EMS providers' [Accessed: 14 March 2015] (Reference number 3 in matrix).
4	Kumar, S., Sosnoski, M. (2011) 'Decision framework for the analysis and selection of appropriate transfer pricing for a resilient global SME manufacturing operation – a business case' [Accessed: 14 March 2015] (Reference number 4 in matrix).
5	Kumar, M., Antony, J., Tiwari, M. K. (2011) 'Six Sigma implementation framework for SMEs – a roadmap to manage and sustain the change' [Accessed: 14 March 2015] (Reference number 5 in matrix).
6	Ismail, H. S., Poolton, J., Sharifi, H. (2011) 'The role of agile strategic capabilities in achieving resilience in manufacturing-based small companies' [Accessed: 14 March 2015] (Reference number 6 in matrix).
7	Gunasekaran, A., Rai, B. K., Griffin, M. (2011) 'Resilience and competitiveness of small and medium size enterprises: an empirical research' [Accessed: 14 March 2015] (Reference number 7 in matrix).
8	Thun, JH., Druke, M., Hoenig, D. (2011) 'Managing uncertainty – an empirical analysis of supply chain risk management in small and medium-sized enterprises' [Accessed: 14 March 2015] (Reference number 8 in matrix).
9	Acquaah, M., Amoako-Gyampah, K., Jayaram, J. (2011) 'Resilience in family and nonfamily firms: an examination of the relationships between manufacturing strategy, competitive strategy and firm performance' [Accessed: 14 March 2015] (Reference number 9 in matrix)
10	Chan, J. W. K. (2011) 'Enhancing organisational resilience: application of viable system model and MCDA in a small Hong Kong company' [Accessed: 14 March 2015] (Reference number 10 in matrix).
11	Sullivan-Taylor, B., Branicki, L. (2011) 'Creating resilient SMEs: why one size might not fit all' [Accessed: 14 March 2015] (Reference number 11 in matrix).
12	Burnard, K., Bhamra, R. (2011) 'Organisational resilience: development of a conceptual framework for organisational responses' [Accessed: 14 March 2015] (Reference number 12 in matrix).
13	Ates, A., Bititci, U. (2011) 'Change process: a key enabler for building resilient SMEs' [Accessed: 14 March 2015] (Reference number 13 in matrix).
14	Vargo, J., Seville, E. (2011) 'Crisis strategic planning for SMEs: finding the silver lining' [Accessed: 14 March 2015] (Reference number 14 in matrix).
15	Sharifi, H., Ismail, H. S., Qiu, J., Tavani, S. N. (2013) 'Supply chain strategy and its impacts on product and market growth strategies: A case study of SMEs' [Accessed: 14 March 2015] (Reference number 15 in matrix).
16	Gumus, M, Jewkes, EM, Bookbinder, JH (2008) 'Impact of consignment inventory and vendor-managed inventory for a two-party supply chain' [Accessed: 12 July 2015] (Reference number 16 in matrix).
17	Derrouiche, R., Neubert, G., Bouras, A. (2008) 'Supply chain management: a framework to characterize the collaborative strategies' [Accessed: 12 July 2015] (Reference number 17 in matrix).
18	Borade, A. B., Sweeney, E. (2015) 'Decision support system for vendor managed inventory supply chain: a case study' [Accessed: 12 July 2015] (Reference number 18 in matrix).
19	Borade, A. B., Kannan, G., Bansod, S. V. (2013) 'Analytical hierarchy process-based framework for VMI adoption' [Accessed: 12 July 2015] (Reference number 19 in matrix).
20	Claassen, MJT., van Weele, AF., van Raaij, EM. (2008) 'Performance outcomes and success factors of vendor managed inventory (VMI)' [Accessed: 12 July 2015] (Reference number 20 in matrix).
21	Shen, LX., Govindan, K, Borade, AB., Diabat, A., Kannan, D. (2013) 'An evaluation of vendor managed inventory practices from small and medium indian enterprises' [Accessed: 12 July 2015] (Reference number 21 in matrix).
22	Rahman, M.N.A., Doroodian, M., Muhamad, N., Kamarulzaman, Y. (2015) 'Designing and validating a model for measuring sustainability of overall innovation capability of small and medium-sized enterprises' [Accessed: 30 July 2015] (Reference number 22 in matrix).
23	Anggadwita, G., Mustafid, Q. Y. (2014) 'Identification of Factors Influencing the Performance of Small Medium Enterprises (SMEs)' [Accessed: 30 July 2015] (Reference number 23 in matrix).
24	Sitompul, C. (2012) 'A Supply Chain Planning for Small and Medium Enterprises' [Accessed: 30 July 2015] (Reference number 24 in matrix).
25	Rahab. (2012) 'Innovativeness Model Of Small And Medium Enterprises Based On Market Orientation and Learning Orientation: Testing Moderating Effect Of Business Operation Mode' [Accessed: 30 July 2015] (Reference number 25 in matrix).
26	ElSayed E.S.M., Hamdy, O.M. (2012) 'The Impact of Small Firms' Characteristics on the Requirements of Integrated Logistics with Large Firms' [Accessed: 30 July 2015] (Reference number 26 in matrix).
27	Genaidy, A., Karwowski, W. (2008) 'A roadmap for a methodology to assess, improve and sustain intra- and inter-enterprise system performance with respect to technology-product life cycle in small and medium manufacturers' [Accessed: 30 July 2015] (Reference number 27 in matrix).
28	Günerergin, M., Penbek, Ş., Zaptçıoğlu, D. (2012) 'Exploring the Problems and Advantages of Turkish SMEs for Sustainability' [Accessed: 30 July 2015] (Reference number 28 in matrix).
29	Ciemleja, G., Lace, N. (2011) 'The Model of Sustainable Performance of Small and Medium-sized Enterprise' [Accessed: 30 July 2015] (Reference number 29 in matrix).
30	Thomas, AJ. (2006) 'Creating sustainable small to medium enterprises through technological innovation' [Accessed: 30 July 2015] (Reference number 30 in matrix).
31	Bos-Brouwers, H.E.J. (2010) 'Corporate Sustainability and Innovation in SMEs: Evidence of Themes and Activities in Practice' [Accessed: 30 July 2015] (Reference number 31 in matrix).
32	Priyanto, A., Aslichati, L., Kuncoro, S. (2012) 'The Custom Made Strategy of "Satu Kayu Desain Enterprise" in Efforting to Achieve Sustainable Competitive Advantage' [Accessed: 30 July 2015] (Reference number 32 in matrix).

The figure below summarizes the literature review article selection process, including the databases used, the searches conducted, and the articles selected during the systematic abductive approach, the design of which is influenced by the work of Kauppi et al. (2013).

Figure 2 – Systematic Literature Review Flow Chart – Abductive Approach



2.2 Systematic Literature Review

Globalization presents an opportunity as well as a challenge for SMEs operating in high cost regions. Belu et al. (2018, p. 44) proposed that the competitiveness pressure created by globalization affects all commercial and financial organizations, regardless of their size. Etemad (2005, p. 145) proposes that globalization offers SMEs more opportunities, including a larger market, but, at the same time, provides more competition. Radicic et

al. (2016, pp. 1428-1429) propose that companies that rely on traditional production processes are “vulnerable to competition from low-wage countries and activities may even be relocated to such countries”. Genaidy and Karwowski (2008, p. 70) note that, due to increased manufacturing costs, U.S. companies are being forced to send their operations off shore and that these decisions are “greatly impacting the vitality of small and medium manufacturers in the U.S. economy”.

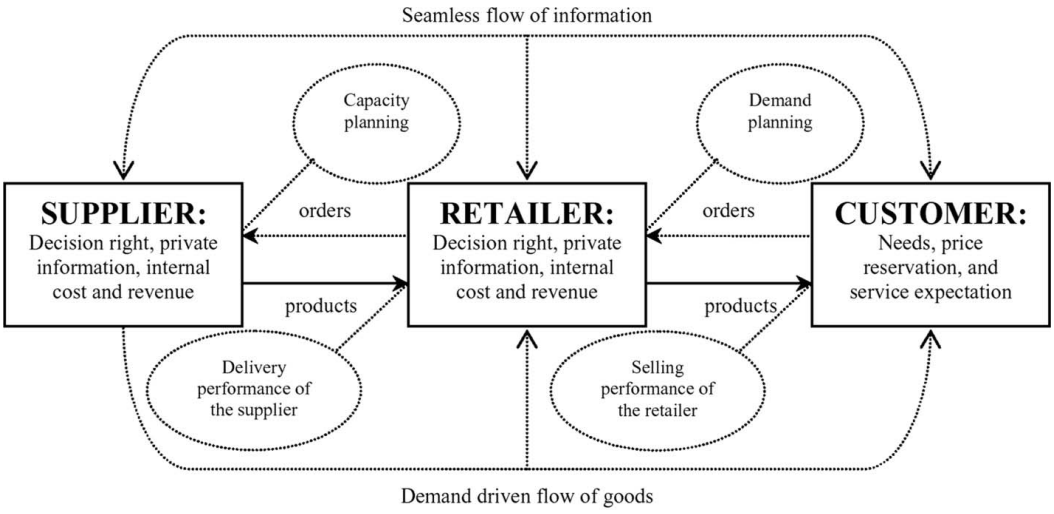
This section provides a summary of how the literature review informed the researcher about the key factors found to influence business sustainability. These factors can be regarded as either advantaging or disadvantaging business sustainability. For example, if an SME engages in supply chain integration or collaboration practices, it might support its sustainability. Similarly, if it does not engage in this practice, it might negatively affect its sustainability efforts. It is important to note that some factors were often not identified separately, but in an integrated fashion, sometimes suggesting an interrelationship between the identified factors. For example, Gunasekaran et al. (2011, p. 5493) found that the factors that impact SMEs’ competitiveness are “organizational structure, people management, use of technology, nimbleness, generation of capital, gathering of information, networking ability, supply chain integration and flexibility, market knowledge, quality of production, marketing and distribution techniques used and ability to reassess its position in the supply chain”. They found that supply chain integration, flexibility and networking were key to supporting lock-in with customers, hence supporting SME business sustainability by creating dependency in terms of the products and services they provide.

Derrouiche et al. (2008) proposed that due to intense competition, organizations should collaborate with supply chain partners, both upstream and downstream. This collaboration can help reduce cost, enhance revenue, increase flexibility, and reduce uncertainties in supply and demand. One of the programs for collaboration that the authors proposed is Vendor Management Inventory (VMI) (Derrouiche et al., 2008, p. 426). The supplier could use VMI as a way to lock-in the relationship with their customer and create dependency on their service, thereby increasing business sustainability.

Borade and Sweeney (2015) agree with Derrouiche et al. (2008) that VMI is a collaborative approach that can result in a competitive advantage, bringing together customers and suppliers. Such a collaboration can help SMEs lock-in business with their customers, as this process can improve MNCs' cash flow by reducing their inventory investment. They also agree that this type of program can help reduce cost, increase profit, reduce stock-outs, reduce inventory, control supply chain variability, increase responsiveness and flexibility, and increase service, benefiting both sides in the relationship (Borade and Sweeney, 2015, p. 4789). The authors noted that even though these programs can be highly beneficial, they are seldom practiced by SMEs. However, they also proposed that a high level of supply chain integration requires better information sharing and strategic coordination, requiring SMEs to collaborate and depend on each other to be successful in the market place (Borade and Sweeney, 2015, p. 4812). This could serve SMEs very well, as it becomes more difficult for the MNCs to switch to other suppliers, including those in Low Cost Regions (LCR). In addition, Borade and Sweeney's (2015, p. 4792) research showed that VMI practices have been applied effectively for inventory decision-making to balance demand and supply. Claassen et al. (2008, p. 411) agree with Borade and Sweeney (2015) that VMI is effective in balancing demand and supply and in providing a win-win solution for partners in the supply chain, decreasing administration and inventory costs, while reducing lead times and minimizing the risk of demand amplification through the enhanced collaboration of the parties. This supports the position from Gümüs et al. (2008) that focus on how programs such as VMI or Consigned Inventory can help improve the overall performance of the supply chain between customer and supplier, including reducing the overall cost for both organizations. This practice could reduce the cash tied in inventory for the customer, while providing an opportunity for the supplier to lock-in the relationship, as the customer might avoid moving away business due to how difficult will be to reimplement such programs. In addition, the authors propose that other benefits this type of program provides are flexibility in production and freight cost reduction (Gümüs et al., 2008, p.516).

Yu et al. (2009) propose that trust and commitment are important factors to make VMI implementation effective, aligning with the relationship factors proposed by Claassen et al. (2008, p. 408) as essential for VMI success. Supporting studies from Alves and Matos (2012) and Alas et al. (2009) proposed that technological and cultural dimensions are some of the major road blocks in manufacturing and services faced by SMEs when implementing VMI, as communication and information sharing is vital for VMI successful implementation. Shen et al. (2013) propose that VMI is an effective tool for improving supply chain performance through inventory cost reduction and the improvement of customer service, which is in alignment with the position of Borade et al. (2013), who proposed that collaborative supply chain management techniques have been widely adopted in recent years, including the use of VMI. This approach, however, requires the sharing of information between supplier and customer through information technology as shown below in the model created by Simatupang and Sridharan (2005) and adopted by Derrouiche et al. (2008, p. 427). Even though the companies have the right to make internal decisions, they are required to share information across the supply chain to ensure the process is effective.

Figure 3 – A simple structure of a collaborative supply chain



A simple structure of a collaborative supply chain

Source: Simatupang and Sridharan, 2005

A possible concern for SMEs is the potential investment required for modern information technology that allows the communication with external entities. In addition, cost information might be sensitive to the supplier or retailer and can influence their decision about price transparency between parties. The supplier and retailer might be assigned the right to make decisions on behalf of their respective customer and metrics might be established to measured delivery and selling performance effectiveness, as illustrated in Figure 3, page 21. Borade et al. (2013, p. 963) raised the concern that these organizations could have "conflicting objectives, varying cultures, and organizational designs", which makes this integration difficult or unproductive and could affect the supplier sustainability in the long run, as trying to meet the customer's price expectation might not be a viable proposition for the supplier. The authors also mention that flexibility is required to deal with these differences and to achieve competitive supply chains and that the most critical factors to adopt these practices are the organization's strategic driver and their information sharing practices (Borade et al., 2013, p. 975).

Elsayed and Hamdy (2012) propose that a manager's role and the organization's strategic vision are key factors impacting the competitiveness of SMEs and their logistics integration with supply chain partners. The authors mentioned that it is important for SMEs to adopt integrated systems to increase speed and fluidity in order to synchronize demand and supply (Elsayed and Hamdy, 2012, p. 147). They regarded integrated systems as having three key themes including lean logistics, agile logistics, and integration, which consequently should result in faster deliveries, reduced inventories and handling, lower costs, and increased flexibility and responsiveness, while integrating all systems into one chain. Collaboration, cooperation, and alliance formation may be regarded as aspects that are fundamental for sustainability, although the authors propose that these can be hindered by the manager's own sustainability objectives (Elsayed and Hamdy, 2012, p. 149). Günerergin et al. (2012) also highlight collaboration and propose that SMEs should include in their strategic plan an imperative to form strategic alliances and global collaboration with Multi-National Enterprises (MNEs) as a way to achieve sustainability. Although the focus of the authors relates to all aspect of sustainability,

such as social, environmental, and financial sustainability, collaboration seems to be key to explore during the interaction with SMEs.

Demmer and Vickery (2011) discussed the main challenges faced by SMEs, including global competition, increasing customer demands, rapid changes in technology, and economic and financial system uncertainty. The authors propose that there are four key challenges that large organizations face while attempting to become resilient: "cognitive, strategy, political and ideological obstacles" (Demmer and Vickery, 2011, p. 5397). These challenges are contrasted with the four strategies to innovation proposed by Reinmoeller and van Baardwijk (2005, p. 63), including increased commitment to knowledge sharing, prudent exploration, measured cooperation, and increased entrepreneurial behavior. They propose that a company needs to balance between these four innovation strategies to become resilient. This proposition aligns with Rahman et al. (2015), who propose that SMEs engage in innovation to enhance their competitive position due to intense competition driven by changes in technology and globalization. The authors focus on technology innovation of new products and processes, which they believe could drive market and cost advantages, resulting in a competitive advantage (Rahman et al., 2015, p. 538). Priyanto et al. (2012) recognize the challenges SMEs face regarding rapid technology development and global competition and propose that a custom-made strategy could be a key factor to create a competitive advantage and out-perform the competition. This aligns with Bos-Brouwers (2010), who proposes customization as a strong way SMEs can improve their relationship with customers, and with Thomas (2006), who sees an increased need for customization. Customization can become a way for the suppliers to lock-in their customers' supply chains, as it creates a dependency on a supplier's services or products.

Li et al. (2011) focused their research on the electronic manufacturing sector, specifically Japanese SME organizations, and proposed that competition and change in technology are two key factors impacting SMEs' ability to grow. Following the multi-case-studies that they conducted, the authors proposed three perspectives that SMEs could follow to grow their businesses: supply chain re-organization, acquisition, and responsiveness. First, a

'breadth-on-top-of-depth' approach provides the opportunity to increase a company's technical knowledge, helping to expand its product's feature range. Second, companies could follow a transformation approach, which includes acquiring another company; this approach expands the boundaries of the company, allowing it to reach other markets. The third approach they could follow is to diversify, which could help expand their products and production capabilities (Li et al., 2011, p. 5419).

Taylor and Branicki (2011, p. 5568) propose that flexibility, adaptation, and innovation are key behavioral capabilities required to achieve resilience. Their focus is to evaluate resilience as a consequence of extreme events, and their research builds on the fields related to business continuity and disaster management. The authors evaluate the organizations' capability and utilize four key elements to evaluate the management competency: resourcefulness, technical, organizational, and rapidity. The authors propose that SMEs are negatively impacted due to resource constraints, including financial, technological and human resources (Taylor and Branicki, 2011, p. 5568). Sharifi et al. (2013, p 399) concluded that flexibility and innovation are important attributes SMEs should acquire to be successful. These findings align with those of Taylor and Branicki (2011, p. 5568).

The study undertaken by Anggadwita and Mustafid (2014) found the entrepreneurial characteristics and competence of human resources to be significant factors affecting SME performance. The authors attempt to develop a performance measurement framework to help SMEs to compete in the market place. This framework includes "entrepreneurial aspects, competence of human resources, innovativeness, and sustainability" (Anggadwita and Mustafid, 2014, p. 415). Bos-Brouwers (2010, p. 420) recognized these factors as vital, and focuses in the importance of innovation processes as a means to sustainability. The author also highlights some of the human resources issues that impair SMEs in the market place, such as weak managerial skills in planning and delegation, focus on short term gains, lack of resources, and difficulty in attaining bank funding or venture capital. Although some SMEs may be highly innovative, there could be other factors that hinder their ability to achieve long-term sustainability.

Ciemleja and Lace (2011, p. 507) focus on the performance measurement of SMEs and how they engage in modern business management methods and tools. They describe the importance of the managers' skills to deploy these methods and tools, in order to use their resources effectively and efficiently to create profit. The authors also attempted to learn which factors or parameters affect performance and help in the value creation process. They propose that these parameters change because goals, strategy, organizational structure, processes, technology and culture also change. Although the authors concluded that it is impossible to apply the same performance assessment to all enterprises due to their uniqueness, they recognized the importance of management knowledge and enterprise management as important factors in the process of value creation and sustainability. This supports Acquaah et al. (2011, p. 5528) study, which proposes that family businesses have a poor management pool and lack skilled employees and capital. This latter position is important to the research study, as it proposes that SME owners, although well intentioned to sustain their business, might make sub-optimal or weak decisions as they are mainly focused on the now and then, driven by a lack of strategic decisions skills and short-term wins approach. This aligns with Ates and Bititci (2011, p. 5603) who reiterate that lack of skills and capability to drive long-term strategic change impacts the ability of these organizations to become resilient. They describe how customers continue pushing for low-cost solutions, innovative responses, and new product development to align with their need. This can drive SMEs to a reactive mode, which motivates them to "think and plan in the short term" (Ates and Bititci, 2011, p. 5603), rather than using the knowledge to create long-term, sustainable solutions. This also aligns with Sharifi et al. (2013), who suggest that SMEs tend to be technically inclined rather than strategically minded and that their strategic planning is not a strong management competency (Sharifi et al., 2013, p. 404-406). If SMEs are able to proactively engage in new product development with the MNCs, SMEs could lock-in business by sharing design co-ownership, resulting in long-term business sustainability.

Ismail et al. (2011, p. 5473) propose that SME owners and managers, although technically capable, lack a strategic view and are typically reactive rather than proactive.

The authors further point out that operational agility alone is not enough for resilience and that a strategic perspective is needed for enabling growth. This aligns with Gunasekaran et al. (2011, p. 5490) who propose that SMEs' resilience and competitiveness are influenced by operations strategies, technology, and globalization. Acquaah et al. (2011, p. 5528) compared delivery strategy to flexibility for both family and non-family small businesses. One of the author's arguments is that family and non-family firms differ in their ability to align manufacturing and competitive strategies because of their different capabilities and resources. They further propose that non-family businesses can become resilient through the use of manufacturing strategies by using bargaining power and strong relationships with suppliers to attain cost leadership. Chan (2011) describes SMEs as strategic partners for big enterprises and provides a list of challenges they might face including technological, regulatory, global economic, market conditions, customer requirements, and competition aspects. He proposes that studies in organizational resilience will include aspects related to behavior, sense-making, self-renewal, risk management, and systems approaches (Chan, 2011, p. 5547). Chan (2011, p. 5556) also proposes the use of financial ratios to measure the level of trustworthiness and expertise. This will be relevant to the research, as these financial ratios could be a means to gauge the current business condition of the organization and perhaps be able to gauge the SME's ability to be financially sustainable.

Vargo and Seville (2011, p. 5619) linked the inability of business owners and managers to think strategically with an organization's long-term survival and the limited information available on becoming more effective. The authors focus on crisis management and strategic planning factors, linking these two approaches to create resilience in the organization. Sharifi et al. (2013) provide an interesting perspective about strategic growth direction and the linkage with supply chain strategy. The authors suggest that SMEs often do not consider engaging in supply chain strategy prior to introducing a product and that this limits their ability to grow. While developing their literature review, the authors found that SMEs typically do not proactively engage in strategic decisions and that they tend to focus on day-to-day operations rather than long-term growth (Sharifi et al., 2013, p. 399).

Rahab (2012) focuses on the importance of SMEs having a market orientation, especially through such aspects as flexibility and fast response time. The author found that market orientation has a positive effect on learning orientation and innovation. The author concluded that linking customer orientation, learning, and innovativeness aspects could help SMEs create sustainability for their business (Rahab, 2012, p. 106). Similarly, Bos-Brouwers (2010, p. 430) identified positive factors that help SMEs in the market place. These include the role of the manager in innovation practices, the flexibility of SMEs that is typically superior to larger organizations, and the willingness of SMEs to engage in the customization of products. These can serve as a way to lock-in the customer relationship. The author also recognizes that SMEs demonstrate positive behavioral conduct when dealing with customers due to their informal leadership style, flexible capabilities, and motivated personnel (Bos-Brouwers, 2010, p. 431). This aligns with the traits proposed by Bhamra et al. (2011, p. 5380) who compared SME organizations with people and suggested that SMEs require four traits for achieving resilience: flexibility, motivation, perseverance, and optimism.

Burnard and Bhamra (2011) focused their study on how to adapt to high impact, low probability events, such as natural disasters, terrorism acts, market crashes, and even changing customer demands. Developing adaptive systems as proposed by Burnard and Bhamra (2011, p. 5587) is regarded as a key ingredient to achieving business sustainability. This is an aspect that will be considered during the research study, as finding evidence of how SMEs manage to remain resilient to changing customer demands could help other organizations learn and succeed. Other factors proposed by the authors to enable resilience are operational flexibility and innovation. This concurs with the position of Ismail et al. (2011) and Taylor and Branicki (2011), who consider flexibility and innovation as key factors in becoming resilient. Finding a way to measure or assess these factors during the research study could help validate the linkage of these factors to business sustainability.

Derrouiche et al. (2008) propose the use of five elements to enhance the relationship between partners, including: appropriate performance system, sharing of information, decision synchronization, incentive achievement, and streamlined inter-enterprise business processes (Derrouiche et al., 2008, p. 428). However, a concern the authors identify is that individual organizations will often make decisions that benefit their own business without consideration of all supply chain partners, using a myopic approach to maximize revenue or minimize cost (Derrouiche et al., 2008, p. 428). This is an aspect that needs to be discussed and agreed upon when setting supply chain collaboration programs, if programs are to be effective and successful. The proposition from Derrouiche et al. (2008, p. 428) aligns with Sitompul (2012, p. 388) who proposes that collaboration through the sharing of information could help supply chain members be more effective in supporting their customer demand in a timely manner. This approach seems to have a similar effect as the VMI programs proposed by Gümüs et al. (2008), Claassen et al. (2008), and Borade et al. (2013). Sitompul (2012) proposes that SMEs should form strategic relationships in order to improve their operational efficiency and reduce their capacity constraints.

Kumar and Sosnoski (2011, p. 5433) focus on the subject of transfer price and double taxation. Although important from a legal standpoint, this is beyond the scope of this research. However, the authors touch on a significant piece of research conducted by AMR that found the top priority areas for organizations include materials cost reduction, customer service improvement, manufacturing efficiency improvement, optimizing internal supply chain costs, and reducing supply chain risk. This aligns with the proposition from Thomas (2006, p. 1) who states that SMEs should develop “leaner, flexible, and more responsive manufacturing systems” to cope with the current manufacturing environment. This is a consequence of the increased need for customization, higher requirements for quality, consistent delivery time, and lower cost demanded by customers, as well as the increased competition and use of low-cost country labor that aggravates the playing field (Thomas, 2006, p. 1). The author suggests that even when the SMEs know of the importance and possible consequences of not having such manufacturing technologies, they hesitate to make a major financial and

resource investment. The concern of resources is shared by Thun et al. (2011), who present two practices associated with driving cost reduction, including outsourcing and single sourcing (Thun, et al., 2011, p. 5514); however, the authors are concerned with SMEs adopting these approaches because SMEs typically have limited resources and know-how to deal effectively with these practices.

Genaidy and Karwonski (2008, p. 71) state that SMEs in the manufacturing sector are increasingly challenged by evolving technology, changing customer demands, and high costs of manufacturing, driving some of their businesses to be moved to offshore suppliers. The authors list a total of eleven approaches to help SME sustainability: Advanced Quality Systems, Design for Manufacturing and Assembly, Design of Experiments, International Organization for Standardization, Lean Pathways, Malcolm Baldridge National Quality Award Criteria, Manufacturing Technology Programs, Quality Function Deployment, Six Sigma, Technical Risk Identification and Mitigation Systems, and Theory of Constraints (Genaidy and Karwonski, 2008, p. 71). In addition, Genaidy and Karwonski (2008) present a process for technology and product development geared to improve their timeliness, quality and cost. The authors claim that this process and the eleven approaches are intended to improve the organization's performance and help USA firms to maintain the lead in the global economy, which is in jeopardy due to the challenges of evolving technology, changing customer demands, and high costs of manufacturing. The authors suggest that there is a need for further research for a system that can enhance the competitiveness of the USA manufacturing firms to compete in the global markets.

Gunasekaran et al. (2011, p. 5493) proposed various key factors to competitiveness including the use of technology, information, supply chain integration, flexibility, and distribution techniques. This aligns with a study by Lefebvre et al. (1995) that surveyed 86 SMEs in Canada and found that selective use of technology was key for all SMEs including those categorized as no-growth, intermediate growth, or rapid growth firms. The study found that selective use of technology helped no-growth firms improve productivity and become more flexible; helped intermediate firms improve effectiveness of their

administration, reduce cost, and improve flexibility; and helped rapid-growth firms customize responses and reduce lead-times.

The following matrix shows the relationship between the 32 articles selected and the 66 factors identified in those articles. It also shows how these 66 factors are ranked based on the frequency they appeared in the articles selected.

Table 2 - Articles and Factors Relationship Matrix

	Critical Literature Review Articles																															
Factors Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	Total
Supply chain integration (VMI, Customization, Collaboration)		1					1	1	1							1	1	1	1	1	1			1		1	1	1		1	1		16
Innovation / Technology		1					1			1	1	1	1		1						1	1	1		1		1	1	1		1	1	16
Knowledge / Skills / Capabilities	1	1	1			1	1	1	1			1	1		1							1	1		1			1	1		1		16
Strategy / Strategic Planning / Long-term planning	1	1				1	1		1				1	1	1			1	1			1		1		1		1	1			1	16
Flexibility	1					1	1				1	1			1	1	1	1	1						1	1		1		1	1		15
Communication							1						1				1	1	1	1	1	1		1	1								10
Cost reduction / cost leadership / low cost				1									1			1	1	1		1	1					1	1			1			10
Competition		1	1							1							1					1					1		1		1		8
Customer requirements / demands		1								1		1	1														1						5
Human Resource constraint / limited resources						1		1			1		1		1																1		6
Management capability / competency									1		1															1			1		1		5
Risk			1	1						1							1			1													5
Customer services				1														1			1									1			4
New product development													1		1							1					1						4
Responsiveness			1															1		1						1							4
Organizational structure							1												1		1								1				4
Behavior	1	1								1																							3
Varying Cultures																			1			1							1				3
Capital / money							1		1														1										3
Financial constraint					1						1																				1		3
Efficiency				1																	1		1										3
Global competition / globalization							1			1												1											3
Technology rapid changes		1	1																														2
Adaptation											1	1																					2
Change management					1								1																				2
Motivation	1																														1		2
Dynamic	1	1																															2
Resourcefulness											1																			1			2
Reactive vs proactive approach						1		1																									2
Trust																				1	1												2
Capacity			1																					1									2
People management							1						1																				2

	Critical Literature Review Articles																														
Factors Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	Total
Quality of production							1																							1			2
Crisis management											1			1																		2
Perseverance	1																																1
Optimism	1																																1
Cognitive		1																															1
Nimbleness							1																										1
Sense-making										1																							1
Self-renewal										1																							1
Conflicting Objectives																			1														1
Entrepreneurial Aspects																							1										1
Owner/Top Management Dominance																									1								1
Short Term Focus																															1		1
Marketing and distribution techniques							1																										1
Rapidity											1																						1
Project Development																						1											1
Idea Managemenmt																						1											1
Diversify (Number of Products and Production Capabilities)			1																														1
Technical constraint					1																												1
Time constraint					1																												1
Region Development Level																										1							1
Government Investment																												1					1
Agility						1																											1
Complexity								1																									1
System approach										1																							1
Use of Low Cost Country Labor																														1			1
Economic and financial system uncertainty		1																															1
Political		1																															1
Transfer price				1																													1
Double taxation				1																													1
Outsourcing								1																									1
Single sourcing								1																									1
Regulatory										1																							1
Acquisition / Transformation			1																														1
Market Condition										1																							1

2.3 Key factors selected from the Literature Review

Following the selection and review of the articles, the researcher found that there is not an agreement among the authors and the studies they generated of an overarching, definitive factor or set of factors that help explain how SMEs achieve business sustainability. The authors attributed different explanations as to the reasons why SMEs achieve or do not achieve sustainability. After further reading and summarizing these articles, a total of 66 factors were identified as potential reasons why SMEs' sustainability is impacted in a positive or negative way.

The method used to aggregate the information was a simple tally matrix with the 66 factors identified from the review of articles. The information was organized with factors listed on the left and a column with numbers representing each of the articles selected. A number was assigned to each article based on the order they were selected during the article search and selection process. In the reference section, each article has a number assigned. Table 2a below (condensed version) shows the top seven factors with the highest tally count. The entire list of all 66 factors and the frequency they appear in the articles are included in Table 2 (pages 31-32).

Table 2a - Articles and Factors Relationship Matrix (condensed version)

	Critical Literature Review Articles																													
Factors Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	Total
Supply chain integration (VMI, Customization, Collaboration)		1					1	1	1							1	1	1	1	1	1			1		1	1	1		1	1		16
Innovation / Technology		1					1			1	1	1	1		1						1	1	1		1		1	1	1		1	1	16
Knowledge / Skills / Capabilities	1	1	1			1	1	1	1			1	1		1							1	1		1			1	1		1		16
Strategy / Strategic Planning / Long-term planning	1	1				1	1		1				1	1	1			1	1			1		1		1		1	1			1	16
Flexibility	1					1	1				1	1			1	1	1	1	1						1	1		1		1	1		15
Communication							1						1				1	1	1	1	1	1		1	1								10
Cost reduction / cost leadership / low cost				1									1			1	1	1		1	1					1	1			1			10

After creating the tally matrix, the information was sorted from high to low, in order to identify which factors were most frequently mentioned throughout the articles. As can be observed in the table above, the top seven factors were mentioned in at least 10 articles.

These seven factors emerged as key because of the frequency they were mentioned in the articles during the literature review and their relationship to SME sustainability. The key factors selected were eventually integrated into the research questions used during the case studies interview process.

The following is a synopsis of the key factors selected based on the factor's frequency, rather than their relative importance.

- Supply Chain Integration
- Innovation
- Knowledge
- Strategy
- Flexibility
- Communication
- Cost Reduction

The first factor, Supply Chain Integration or Collaboration, is defined as "two or more enterprises working together to create a competitive advantage" (Derrouiche et al. 2008, p. 426). It relates to processes aimed to interconnect and create some type of dependency between customer and supplier, including initiatives related to Vendor Management Inventory (VMI), consignment stocking programs, and collaboration on product customization. These processes were referenced in a total of 16 articles. Some of the articles depicted the importance of supply chain integration programs, such as Vendor Management Inventory (VMI), and the customization of products and services, network relationship, and collaboration as ways to lock-in the relationships between customers and suppliers. VMI is a program where the suppliers will manage the inventory of the products they provide to a customer at the customer site. This helps minimize the administration burden on the customer by eliminating the need of placing purchase orders and warehousing material, reduces the customer inventory carrying cost, and provides other benefits such as material availability and shortened lead times. Other factors, such as flexibility, information sharing, and technology might enable customers and suppliers to engage in supply chain integration practices such as VMI. VMI also helped to reduce

transportation and logistics cost, which is an element the customers value. In addition to VMI, another example in the literature of integrating processes was Consigned Inventory, which helps reduce working capital for customers. Bos-Brouwers (2010, p. 430) links customization with product innovation based on customer demand. He proposes that SMEs that become sustainable are those with an orientation to value creation, innovation management, and cooperation with stakeholders. If suppliers introduce themselves into their customers' product design cycle, they have the opportunity to lock-in a design that might be difficult for their competitors to imitate (Priyanto et al., 2012, p. 55), creating a competitive advantage. Lock-in aspects help create dependency in customer-supplier relationships, helping to ensure that the relationship goes from a transactional arm-length relationship to a partnership relationship.

The second factor, Innovation, defined as a "significant change, preferably an improvement in a real product, process or service compared with previous achievement" (Bos-Brouwers, 2010, p. 418) was referenced in a total of 16 articles. Innovation, through the use of technology or process improvement, can help SMEs create a competitive advantage over other SMEs operating in low-cost regions. The use of technology or process improvement could help reduce labor cost, minimizing the apparent advantage that operating in low-cost regions can offer. Innovation was used in many instances interchangeably with technology. Often, it was referenced as an approach to outperform the competition. In addition, it was considered a factor that makes businesses more effective and was usually referred to as a factor required to achieve resilience (Taylor and Branicki, 2011).

The third factor, Knowledge, is defined as "a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information" (DiPasquale and McInerney, 2010, p. 342). This factor was referenced in a total of 16 articles. Knowledge, a factor linked to skills and capabilities of the human resources of a company, could also provide a competitive advantage to a company when engaging in a customer-supplier relationship. The absence of knowledge will also hinder SME sustainability.

The fourth factor, Strategy, relates to how a company "specifies the potential products and markets, long-term objectives and policies for achieving the objectives" (Gunasekaran et al. 2011, p. 5492). This factor was referenced in a total of 16 articles. This factor, which is linked to a long-term focus, rather than short-term view, can support driving operational effectiveness and creating long-term relationships. Strategy, flexibility, and cost reduction were themes that were repeated throughout the literature as significant factors impacting SME performance and sustainability. The lack of strategy was often associated with the SME owner or manager's decision-making, likely due to the short-term focus that can permeate the SME's management (Ates and Bititci, 2011) and could be driven by their short-term concern to keep the business afloat. Vargo and Seville (2011) start their article with a statement about the inability of business owners and managers to think strategically and the impact this has on an organization's long-term survival and the limited information available on becoming more effective (Vargo and Seville, 2011, p. 5619). The authors focus on crisis management and strategic planning and link these two approaches to create resilience in the SME organization.

The fifth factor, Flexibility, is defined as "the ability to shift promptly from one process and/or product configuration to another and to adjust quantities of output rapidly up or down over the short run" (Hu, 2007, p. 289). This factor was referenced in a total of 15 articles. Flexibility demonstrates a company's ability to meet increasing customer demand in a short period of time. Ismail et al. (2011) proposed that agility and flexibility could lead SMEs to compete more effectively in the market place and to become closer with customers. This intimacy seems to be a key factor that affects the ability of SMEs to create sustainability. However, similar to Kumar et al. (2011), the authors point out that SMEs are constrained in becoming agile due to a lack of resources and capabilities (Ismail et al., 2011, p. 5470).

The sixth factor, Communication, which includes internal and external information sharing, was referenced in a total of 10 articles. Communication or the sharing of information between companies allow the organizations to align their resources to meet

the market needs. The literature indicated information sharing and process integration strengthen communication. This seems as an important factor to probe during the case studies, as it can help SMEs lock-in the relationship with their customers. Holt et al. (2007, p. 52) proposed that SMEs strategy to "integration of information and communication technology" enables business growth.

The seventh factor, Cost Reduction, which includes costs from material, labor, logistics, overhead, or any other operational cost, was referenced in a total of 10 articles. Cost effectiveness not only helps the SMEs' long-term business sustainability but also reduces the risk to their customers' businesses. This factor can also enable the SME to be price competitive in the market place. Genaidy and Karwonski (2008, p. 71) stated that SMEs in the manufacturing sector are increasingly challenged by evolving technology, changing customer demands, and high costs of manufacturing, driving some of their business to offshore suppliers. The authors list a total of eleven approaches to help SMEs' sustainability, including Lean, Six Sigma, and Theory of Constraints practices. The authors suggest that there is a need for further research of a system that can enhance the competitiveness of the USA manufacturing firms to compete in the global markets. Kumar et al. (2011) highlight the importance of recognizing that SMEs have different characteristics when compared to large enterprises, and these need to be considered when designing programs to make them cost effective. The authors also recognize the importance of following a structured approach to change management in SMEs to assure resources are better utilized (Kumar et al., 2011, p. 5450). During a review of various improvement models, the authors found limited evidence of how SMEs can sustain the improvements created by such programs as TQM or Lean, aspects that could affect their resiliency (Kumar et al., 2011, p. 5451). The authors point out that they have not found any research project or literature that proposed a generic implementation of Six Sigma in SMEs. To address this gap in the literature, this research study will investigate if there is a type of sustainability practice, such as Lean Manufacturing, Theory Of Constraints (TOC), Value Analysis / Value Engineering (VA/VE), and Supply Chain Strategy that the SMEs have embraced to create business sustainability. These sustainability practices will be explored during the Case Studies to learn if they have an impact on SME

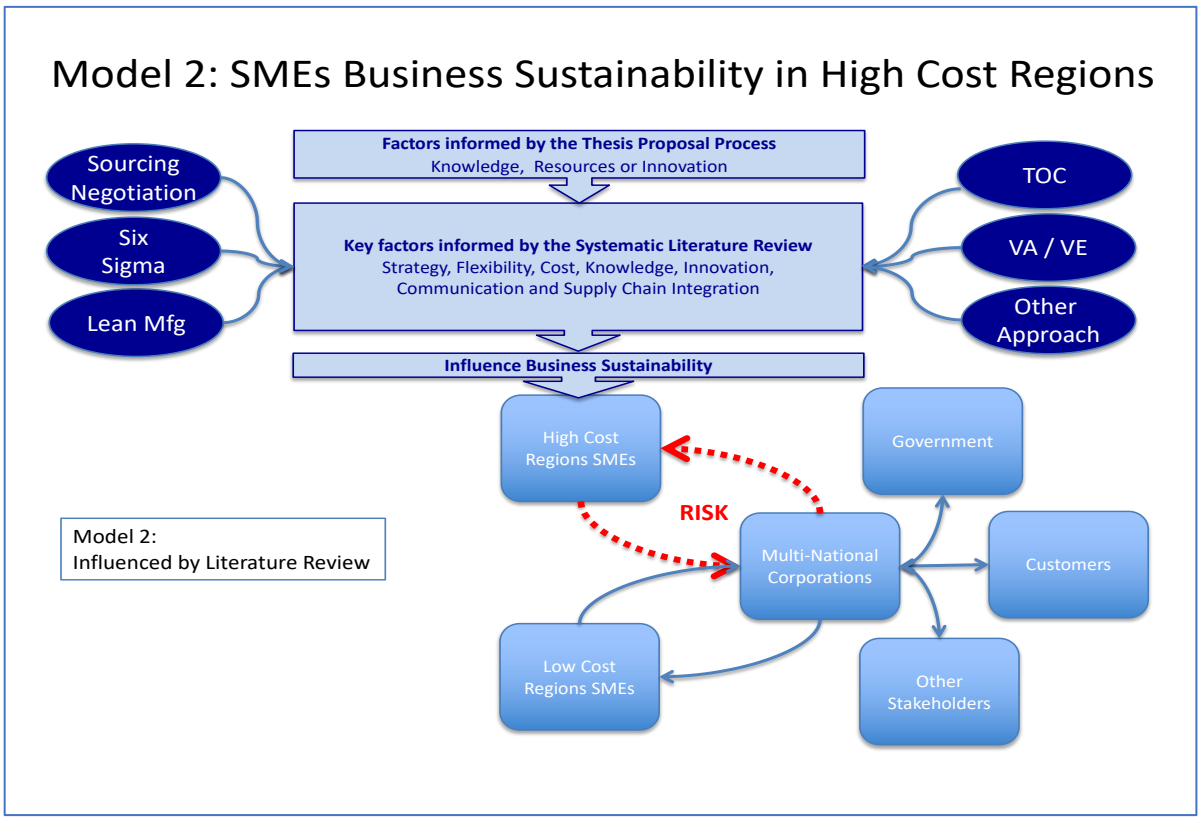
sustainability. These sustainability practices have been added to the Conceptual Model as illustrated in Figure 4, page 39.

The seven factors identified through the literature review helped to shape the questionnaire used during the research study interview process, which is addressed in the methodology section. Also, it spiked an interest to learn more about ways to lock-in, including customization, as this might be a sustaining recipe for SMEs operating in high-cost regions.

2.4 Theoretical Framework Model influenced by the Literature Review

It is proposed that SMEs operating in high-cost regions have significant business sustainability risks when dealing with MNCs. The risks are mitigated by their operational effectiveness, their business sustainability approaches, and the level of knowledge, resources, or innovation SMEs invest in. MNCs are influenced by many stakeholders and might decide to move work to suppliers in low-cost regions in order to reduce their operational cost or gain access to new markets or technologies. The ability of SMEs to demonstrate competitiveness and support the increased demands of MNCs will make the difference between growing business, staying in business, or being forced out of business. The offshore strategy seems to be influenced by the "economic downturn, heightened emphasis on sustainability, and increasing customer expectations for flexibility and improved cost performance" (Tate et al., 2013, p.382). The following diagram is an attempt to create a framework that illustrates the relationship between MNCs and SMEs in high-cost regions as informed by the initial literature review. It includes how the key factors identified via the literature review could influence business sustainability and affect the relationship between MNCs and SMEs in high cost regions. These factors include: strategy, flexibility, cost reduction, knowledge, innovation, communication, and supply chain integration activities.

Figure 4 – Factors and Practices influencing SMEs Business Sustainability (Model 2)



Tate et al. (2013, p. 382) proposed that the total cost of ownership, quality, supply of materials and services, intellectual property risk, improved flexibility, improvement in speed, simplicity of doing business, working capital, and innovation are some of the factors that influence the trend of reshoring or near shoring. SMEs operating in High Cost Regions such as the USA can capitalize on this trend to create business sustainability.

These seven factors help frame some of the questions developed for the questionnaire that is to be used during the Case Studies:

- How does your business **strategy** address these challenges and tie to business sustainability?
- How do you create **flexibility** to address changing customers, markets, and government demands?
- How do you manage **cost**?

- How do you create and measure **knowledge** in the organization? What is the level of education of your leadership team?
- What is **innovation** for you and how critical is it for your business? How do you determine the level of innovation needed to be successful in the market place?
- How do you **communicate** internally and externally? How do you measure the effectiveness of the communication?
- How do you **integrate your process and products** with your customers or suppliers? How effectively do you use lock-in mechanisms with customers (e.g.: VMI and Customization)?

Holt et al. (2007) conducted a comprehensive study to explore multiple dimensions of SMEs knowledge-bases, which mentioned the importance of the seven key factors selected from the literature review. Holt et al. (2007, p. 51-52) found that smaller companies thrive in being able to demonstrate their operational flexibility and that engaging with other firms in their networks help them grow without the need to incur bureaucratic costs. Holt et al. (2007, p. 48) shared a study conducted by Carson and Gilmore (2000) where they proposed that SMEs owners and managers rely on existing knowledge, personal judgement, experience, and communication skills for day-to-day activities.

2.5 Literature Review Recent Articles

The initial literature review was conducted in the initial stage of the research, helping scope and select the factors to focus on during the Case Studies. The timeframe of these articles dated back 10 years from the time the literature review was initiated. Ten articles selected from the last five years expanded the literature review and confirm the factors selected initially continued to be relevant today.

After reviewing over 150 articles using the same search methodology as in the initial literature review, 10 articles were added which closely aligned with the purpose of the research study. Articles that seemed to focus solely on environmental sustainability or

corporate social responsibility were not selected. The factors found in these more recent articles align with the previous seven key factors selected during the initial literature review, and Table 3 (page 46) is a cross matrix that shows the relationship of the recent articles with those seven key factors. Below is a summary of each of the recent articles, including how they relate to the seven key factors previously selected.

Jordão et al. (2017, p. 668) describes how SMEs can use their networks as a strategy to have an effect on knowledge management (KM) and intellectual capital (IC). They link intellectual capital to innovation and improvement in financial performance, which are key elements in the initial literature review. They share how their literature research shows that intellectual capital is responsible for the generation of innovation and for improvement in financial performance. They describe how KM and IC interrelates with each other and how they are "helping SMEs to produce innovations and enhance performance, creating value and maintaining sustainable competitive advantages in the industries in which they operate" (Jordão et al., 2017, p. 670).

Lopez (2017, p. 27) describes how SMEs, due to their small scale and flexibility, approach product development with more resources. He also shares how lean practices help SMEs on product design processes by reducing waste and how SMEs' product development and creation processes are affected by how they "restructure production to meet emerging market trends" (Lopez, 2017, p. 27). In addition, they found lean manufacturing fosters sustainability, including production flow streamlining and product composition.

Schwab et al. (2019, p. 8) studied a Swiss-based SME via a longitudinal empirical case study and attempted to create a simulation to evaluate the growth risks and understand the elements or factors that needed to be monitored and controlled to help increase the probability of business success. The authors concluded that capacity decisions to support increased customer demands involved trade-off decisions between the cost to increase capacity and the opportunity costs that come from lost sales. They also found that managerial decision-making at different levels, such as strategic, tactical, and operational, are necessary for adapting current resources and internal processes, such

as purchasing and R&D, to the extended production capacity (Schwab et al., 2019, p. 9). The interaction with the SMEs showed that their quest to grow and diversify their business did not come without pain. The authors also expressed concern of bankruptcy during growth periods and identified how important it is for SMEs to negotiate with customers to reduce time to pay for products delivered.

Witjes et al. (2017, p. 529) proposed that disruptive innovation is a strength of more sustainable SME when competing with bigger companies. The authors shared that SMEs can use their "entrepreneurial innovation and organization change" as an advantage over competition, including larger companies (Witjes et al., 2017, p.529). This aligns with the focus on innovation and flexibility that were evident factors in the four Cases. The authors also recommended the use of Case Study as a research approach, as it can be used for generating theory (Witjes et al., 2017, p. 530).

SMEs' use of roundtables is a practice that helps gain best practice knowledge. The authors shared how 300 Dutch SMEs met to share their experiences quarterly from 2008 to 2010 (Witjes et al., 2017, p. 531). This was a practice followed by Companies 1, 2, and 3, in which leadership members met with other companies' leaders from the same region to discuss ways for continuous improvement. They expressed that it helped them learn and share ideas of things they were doing or planning to do. Company 1 expressed the importance of accessing ideas from other SMEs, as the company felt they needed help learning about ways to improve its operation, including inventory management and best practices for material cost reduction. This opened the opportunity for me to help them learn some of the practices related to creating a supply segmentation. I created a pareto of their key commodities and engaged in a formal RFQ to obtain competitive bids and reduce operational cost. Company 1 implemented the learning from our interaction and followed up with the results they obtained; this is an example of the impact action research can have on SMEs' sustainability.

Jones and Corral (2017, p. 265) commented on how the collaboration between management and employees toward knowledge drives innovation and how it results in

improved performance. They provided a conceptual model, which ties these factors to sustainability-oriented innovation. The authors support the use of external resources to complement their internal knowledge, including the interaction of academic resources with industries. Bos-Brouwers (2010) proposes that SMEs lack knowledge and that they are able to generate innovations by teaming up with universities and research institutions. Jones and Corral's (2017, p. 268) study showed that "innovativeness…leads to productivity and sales growth…providing support for the business case for sustainability". Augmenting knowledge was one of the key factors that SMEs focused on through internal and external training and education. They expressed that it was key to look for knowledge outside of their company, as it helped them to learn best practices and how to retain employees.

De et al. (2017, p. 2) propose that the combination of Lean and Sustainability-Oriented Innovation (SOI) can enhance competitiveness in SMEs. The authors explore how supply chain sustainability performance is impacted by supply chain paradigms, such as Lean and SOI. The authors also pointed out that Lean was typically being recognized as a value creation process, linked to productivity and customer satisfaction. They also recognize the value that sustainability-oriented innovation brings to SMEs, consisting mainly of product, process, and organization innovation. However, De et al. (2017, p. 3) found that Lean and SOI are typically researched separately and propose that is important for SMEs to understand their combined benefit when used together. The authors propose that SMEs lack resources and formalized planning processes when compared to large organizations, which can have an impact to their ability to engage in SOI (De et al., 2017, p. 6).

Cantele and Zardini (2018, p. 166-167) focus on the triple bottom line (TBL). However, from a financial standpoint, they propose that customer satisfaction, customer reputation, and organizational commitment goals are a measure of company success and that a competitive advantage is a way to increase profit by increasing revenue or lowering operational cost. SMEs' engagement in continuous improvement could support reduction

of operational cost, while diversification into other markets or industries could support increasing revenue.

Scoutto et al. (2018, p. 1) make the case that stakeholders' engagement can drive organizations to acquire information to help the development of knowledge for the individual and organization that can be used to improve their operation. They point out that SMEs are under pressure to improve technical, organizational, and social capabilities, which helps them capitalize on factors such as innovation and competitiveness. The authors introduced the concept of knowledge intensity as an additional dimension of business innovation and entrepreneurship (Scoutto et al., p. 3). They define sustainable innovation as the organization's ability to adopt and implement new ideas for the generation of new products or processes (Scoutto et al., p. 4). Sustainable innovation was a practice observed in all four cases, where the SMEs were engaging closely with customers to generate new products to meet their needs and ensure future business, while they continued to engage in process improvement to remain competitive.

Kot (2018, p. 2) focused on the sustainable supply chain and defined it as the integration of environmental, social, and economic dimensions. The author explained that the sustainable supply chain is designed to effectively manage materials, information, and capital, as well as improve the profitability and competitiveness of the organization. The author proposed that an SME must have an effective supply chain to compete effectively in the global market, which includes an integration of the stakeholders such as "suppliers, producers, distributors, and customers" (Kot, 2018, p. 3). Kot (2018, p. 3) addresses the importance of sharing information to help coordinate throughout the supply chain and support new product development. The author also proposes that supply chain members should work together to develop new products, parts, and processes so they can react quickly to changes such as size and specification of products in the market place. The author states that SMEs, in contrast to MNCs, recognize the importance of the social dimension and identify the need to establish long term relationships based on the confidence they provide to their partners in the supply chain (Kot, 2018, p. 15). This

relates to the four SME Cases, where the practice of product design collaboration and IP sharing was key to their survival. Their intention to participate in the design process was to ensure future business through long term partnerships.

Trianni et al. (2019, p. 1357) focused on how SMEs lack resources and performance measurement systems to measure sustainability. They studied 26 SMEs in Germany and Italy from two industries, including metalworking and chemical sectors, where the metalworking companies were focused on technology innovation. The authors pointed out the importance of identifying a way to evaluate sustainability performance, but expressed to be concerned with the SME's ability to measure sustainability due to their limited resources (Trianni et al., 2019, p. 1370).

The following matrix shows the relationship of the seven key factors with the most recent articles studied during the Case Study research.

Table 3 – Recent Articles and Seven Key Factors Relationship

Key Factors (literature review) and Essential Factors (Case Studies)	Jordão et al. (2017)	Lopez (2017)	Schwab et al. (2019)	Witjes et al. (2017, p. 529)	Jones and Corral (2017)	De et al. (2017)	Cantele and Zardini (2018)	Scoutto et al. (2018)	Kot (2018)	Trianni et al. (2019)	Total
Strategy	x										1
Flexibility		x				x					2
Cost Reduction			x				x				2
Knowledge	x			x	x			x			4
Innovation	x			x	x	x		x		x	6
Communication								x	x		2
Supply Chain Integration		x	x					x	x		4
Continuous Improvement		x				x					2
Customization / Lock-In											0
Diversification											0

As can be observed in the above articles, factors such as knowledge (Jordão et al., 2017; Witjes et al., 2017; Jones and Corral, 2017; Scoutto et al., 2018), innovation (Jordão et al., 2017; Witjes et al., 2017; Jones and Corral, 2017; De et al., 2017; Scoutto et al., 2018; Trianni et al., 2019), Lean practices that help create flexibility (Lopez, 2017; De et al., 2017), product development collaboration (Lopez, 2017; Schwab et al., 2019; Scoutto et al., 2018; Kot, 2018), and information sharing among stakeholders (Scoutto et al., 2018; Kot, 2018) were some of the key factors mentioned in the readings, aligning with the factors identified through the initial literature review. Lack of resources was one of the negative factors pointed out by De et al. (2017) and Trianni et al. (2019) that affects SMEs' ability to engage in sustainable practices. Lack of resources was also pointed out by Bos-Brouwers (2010) as an issue that SMEs face that can have an impact in their ability to implement business sustainability approaches. The articles that were part of the systematic literature review conducted while the Case Studies' process was taking place show that the seven factors identified previously continue to be relevant, especially innovation, knowledge, and supply chain integration with suppliers or customers. Product

development was a key process that SMEs used to engage with their customers, which helped them share their knowledge and ensure business continuity.

2.6 Reshoring, Near Shoring, and Manufacturing Location Decisions New Trend

This literature review relates to the new trend of reshoring or near shoring and decisions of manufacturing location. In the last decade there has been an intensification of the new trend of reshoring, including near shoring or back shoring manufacturing to the USA. For this reason, I have added various references related to this trend to reflect on how it impacts the premises of MNCs offshoring and SMEs operating in high-cost regions. A total of 15 articles were selected and are described below. These articles show how the new trend is changing some of the decisions of offshoring made in the past and pinpoint factors that are influencing the decision of manufacturing location in LCR or HCR. A review of these factors show that the factors selected during the initial literature review continue to be relevant today, despite the new trend.

Fratocchi et al. (2014, p. 56) define near shoring as “transferring production to another country geographically closer to the firm home country” and back shoring as “moving production back to the firm's home country”. As noted by Fratocchi et al. (2014, p. 54), although near shoring and back shoring are not a new phenomenon, it has intensified in the last few years and is a result of production and purchasing strategies. The authors’ research indicated that reshoring is motivated by concerns about loss of flexibility, ability to deliver on time, and quality issues, in addition to government trade policies. The authors propose that reshoring decisions could be motivated by the search for cost-efficiency vs. market enlargement, locations decisions between low-cost vs. western industrialized countries, activities driven by labor vs. capital intensive, and entry and governance modes decisions such as green-field investments vs. merger and acquisitions or outsourcing approach (Fratocchi et al., 2014, p. 57).

Tate (2014, p. 66-67) proposes that the USA is becoming an attractive location to bring back work due to rising labor costs in LCRs, high oil prices affecting operational cost,

increasing transportation costs, and risk in the supply chain. This recent trend is also a consequence of improvements in productivity, innovation, and product changes in USA-based companies. Other factors influencing the reshoring of manufacturing include IP protection, shortages created due to increased lead time, and increased cost and price of products sourced.

Foerstl et al. (2016, p. 493) proposed that managers have recently started to reverse outsourcing and offshore strategies; however, a combination of reshoring and insourcing might be the best strategy, as there can be work such as prototyping that might be better fitted for in-house work, while component assembly might be more effectively outsourced. The authors attributed some of the change in strategy to factors such as increased coordination with suppliers, increased transportation cost, working capital and safety stock, innovation, and production technology improvements (Foerstl et al., 2016, pp. 500-501).

Wiesmann et al. (2017, p. 16) wrote about reshoring and proposed that the relocation of industrial manufacturing from low-cost to high-cost environments is a new and emerging trend. The authors discussed various factors that these industrial manufacturers consider when reshoring business, including innovation, high coordination costs, risk of disruption, speed and dependability of delivery, balance of supply with demand, accessibility of transportation which drives higher cost and uncertainty, inability to service products, increased need for customization, and distance which can cause problems with control, and loss of innovation (Wiesmann et al., 2017, p. 33). They also proposed that companies engaging in reshoring might yield a better return through differentiation and postponement strategies, where some of the value is added locally (Wiesmann et al., 2017, p. 37).

Stentoft et al. (2016, p. 57) summarized the factors companies considered when deciding to reshore or back shore manufacturing. These factors included cost, quality, time and flexibility, skills and knowledge, and proximity to R&D. They also considered the risks of losing know-how, intellectual property, market, and proximity to customers, among other aspects. Relating to market aspects, the authors shared that having products

manufactured domestically, having proximity to customers, and shrinking market size are three factors that relate specifically to SMEs.

Bals et al. (2016, p. 102) mentioned that since the early 1990s, outsourcing and offshoring have been important business strategies for companies; however, some of these companies are rethinking those strategies and even considering to revert them. The authors propose that this change in direction could be a result of macroeconomics and political changes, hidden tangible and intangible costs, and other strategic considerations, including building a stronger global production network to support their value creation activities (Bals et al., 2016, pp. 110-111).

Di-Mauro et al. (2016, p. 109) used an inductive case study methodology with multiple cases to research back-shoring, a new phenomenon that is still being studied. The authors propose that the offshoring movement was mainly motivated by labor costs, productivity, and the availability of skilled labor in the country considering this strategy. The author also listed other reasons companies decide to offshore, including quality improvement, availability of skilled labor, local knowledge, made-in effect, new product development, key customers' demand related to manufacturing proximity, and economies of scales (Di-Mauro et al., 2016, p. 111). The authors provide six propositions that summarize the contrast between the initial offshoring strategy to the more recent backshoring strategy. For instance, the motivation of the former was to reduce cost while the latter is intended to increase the value perceived by their customers.

Gray et al. (2017, p. 37) studied various cases to investigate the latest reshoring trend, specifically at SMEs. The authors proposed that an increase in total landed costs in Asia, including labor and energy costs, are not enough of a driver for SMEs to decide to reshore. The authors make four empirical observations, including that the SMEs decisions to reshore follow negative events, wider range of factors, including not quantifiable factors, factors that do not relate to environmental concerns, and governance structure shifting away from market governance. Gray et al. (2017, pp. 43-44) propose that SMEs' offshoring decisions were made based on landed cost; however, there could

be other factors that affect offshoring decisions, such as additional landed costs and anticipated problems like quality defects, product disruptions, intellectual property violations, and lack of responsiveness. The latter relates to demand and supply mismatch, innovation timing, including the inability of manufacturing to support R&D new designs, and customization and service timing, which affect customers' inquiries and the integration of new features into products.

Signh-Srai and Ane (2016, p. 7193) proposed that the two key factors that drove offshoring in the initial wave in the 1980s related to seeking low-cost labor and access to new markets. They also proposed that although these factors could also influence reshoring, this phenomenon has other key drivers such as quality, cost reduction, speed and flexibility, supply chain resilience and reliability, government incentives, availability of skilled labor, and local-made designation. The authors also suggested that customers' demand changes in developed economies are a driver to the reshoring trend. This includes "mass customization, shorter delivery times, shorter product life cycles, call for faster product development, rapid replenishment, better customer service and better understanding of local markets" (Signh-Srai and Ane, 2016, p. 7197). They found that of the top four factors of the 46 listed, three related to improved responsiveness to customers, including quicker replenishment, proximity to customers, and quicker product development (Signh-Srai and Ane, 2016, p. 7204). This speaks to the importance of reduced lead time, flexibility, and product customization to meet changing customers' demand.

Zhai et al. (2016, p. 62) found that from 1980 to 2010, millions of manufacturing jobs were eliminated as a consequence of companies seeking to maximize their profit by optimizing the supply chain and utilizing lower labor cost in developing countries. A study conducted by the authors of 139 cases from companies that reshored work from China to the USA during 2009 to 2015 showed that the single most important factor for the change in strategy was quality. However, cost was the most important factor motivating these companies to reshore when the researchers aggregated all factors. Zhai et al. (2016, p. 63) contrasted the benefits of the home country with China as the main motivation for the

reshoring trend, including decreasing cost difference, better quality at home country, shorter lead time, changing purchasing patterns, quicker response to customer demand, and skilled work in the home country. Cost, quality, flexibility, shorter response time, and employee skill are regarded as key factors in the decision to reshore. The cost group includes "wages, shipping cost, and total cost," whereas the operation group includes factors such as "lead time, inventory, control, Lean Manufacturing and reaction to demand" (Zhai et al., 2016, p. 66). These factors can make the difference between becoming more responsive or creating supply chain disruption.

Brandon-Jones et al. (2017, p. 31) suggested that the cost associated with reshoring is outweighed by the benefits of reshoring and that this should be used by companies to justify the decision. The authors proposed that reshoring positively affects the shareholder value and could be more economical than the low-cost regions when all costs are considered (Brandon-Jones et al., 2017, p. 35).

Vanchan et al. (2018, p. 98) proposed that offshoring was a survival strategy used by companies operating in developed economies to be able to compete in markets that were price sensitive. The offshoring enabled the use of low-cost labor. This strategy drove both efficiency and access to new markets. The authors proposed that reshoring was not only meant to drive cost savings but that other drivers such as speed, closeness to market, and the "Made in America" quality were all factors that influence this decision (Vanchan et al., 2018, p. 101). Other factors such as "skilled labor availability, taxation and other governments incentives, low unionization, and low real-estate, and other operating costs" influence where to relocate manufacturing jobs (Vanchan et al., 2018, p. 105).

Ketokivi et al. (2017, p. 21) proposed that there are three principles that motivate companies to create economic activity: locational factors, organizational factors, and temporal considerations. The locational factors relate to "proximity to markets, access to knowledge, and the relative cost of production inputs" (Ketokivi et al., 2017, p. 21). These

are factors that could influence MNCs' decisions to retain or grow business with SMEs in high-cost regions.

Brodd and Helou (2012, p. 293) propose that factors such as the costs of logistics, land acquisition, and energy are higher in China than in the USA, making the total cost comparable and potentially driving reshoring decisions. Also, the authors proposed that trained persons' cost are similar in both countries. Tate et al. (2013, P. 382) proposed that developed countries sent "blue-and white-collar jobs" where costs were significant lower. This included engineering and management jobs. Other factors the authors proposed that are drivers for the reshoring trend includes "higher labor cost, higher raw materials costs, and decreased responsiveness and quality" (Tate et al., 2013, P. 382).

Although reshoring or back-shoring in manufacturing seems to be the reverse of the off-shoring trend observed in the 70s through the beginning of the new millennium, the factors that motivate this new trend seems to be similar to the previous trend. Of the 15 articles studied, all of them mentioned cost as a key reason why they were moving manufacturing away from what was considered low-cost region, whether it was because cost had increased or because they needed to reduce operational cost. Other key factors from the seven originally identified during the literature review that were mentioned on multiple occasions as important for this new trend were the need for knowledge and skills, flexibility, and innovation. In addition, the essential business sustainability practices that surfaced during the Case Studies, including continuous improvement, customization as a lock-in practice, and diversification into other markets, were mentioned individually or in conjunction in 9 of the 15 articles as important factors in the decision to reshoring or backshoring manufacturing. At least 4 articles mentioned each practice to be important.

Table 4 below shows key factors from the literature review and the three essential business sustainability practices that surfaced during the Case Studies and the relationship with the 15 articles added after the Case Studies. Another important factor mentioned in many articles was quality. In most cases, it seemed to be linked to the cost factor, as poor quality drove higher cost. In addition, a factor that seemed to be important

for reshoring was the “made in” designation. Four articles considered this factor to be important during the decision to bring back manufacturing (Di-Mauro et al., 2016; Signh-Srai and Ane, 2016; Stentoft et al., 2016; Vanchan et al., 2018). This was a trait that the four Case Studies were proud to voice during the interview process and during the tours, and it served as a selling point when collaborating with their customers.

Table 4 – Reshoring, Near Shoring and Manufacturing Location Decisions New Trend Articles, Factors and Sustainability Practices

Key Factors (literature review) and Essential Factors (Case Studies)	Fratocchi et al. (2014)	Tate (2014)	Foerstl et al. (2016)	Wiesmann et al. (2017)	Stentoft et al. (2016)	Bals et al. (2016)	Di-Mauro et al. (2016)	Gray et al. (2017)	Signh-Srai and Ane (2016)	Zhai et al. (2016)	Brandon-Jones et al. (2017)	Vanchan et al. (2018)	Ketokivi et al. (2017)	Brodd and Helou (2012)	Tate et al. (2013)	Total
Strategy							x									1
Flexibility	x				x			x	x	x		x			x	7
Cost Reduction	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	15
Knowledge					x		x		x	x			x	x		6
Innovation		x	x	x				x								4
Communication			x		x											2
Supply Chain Integration			x	x		x		x		x						5
Continuous Improvement		x		x	x				x	x						5
Customization / Lock-In				x	x		x	x	x							5
Diversification					x				x			x	x			4

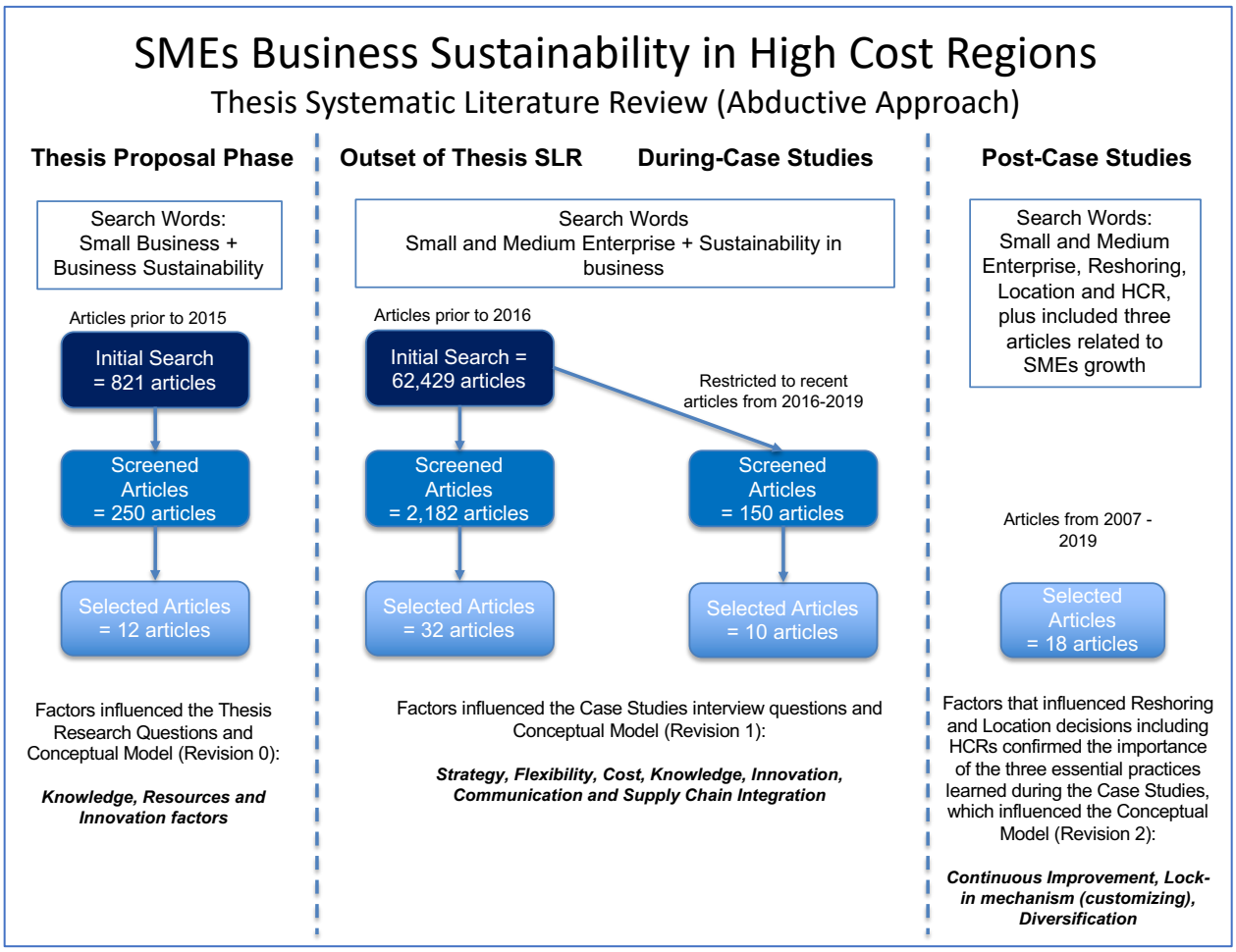
2.7 Systematic Literature Review Abductive Learning Model

The systematic literature review was conducted using an abductive approach to learning by searching, adding, and enriching the body of the literature throughout the research process. A total of 60 articles were selected to help inform the research process.

- 32 articles were selected at the outset of the literature review. These articles informed the research of what were the factors that contributed to SMEs' business sustainability. A total of 66 factors were identified from these articles. The factors that were mentioned most frequently in these articles were selected as key factors. A total of 7 key factors were identified.
- 10 articles were selected recently from last 5 years. These articles confirmed that the factors identified prior to the Case Studies continued to be relevant throughout the period the Case Studies were completed. These references are more recent articles, published between 2016-2019.
- 3 articles were recommended related to SMEs growth and integrated to the study.
- 15 articles related to latest trends were selected. These additional articles were studied to learn about the new trend observed in the last decade of reshoring, backshoring, and manufacturing location decisions, including HCR, and how the factors influencing this trend could support or contradict the key factors found prior to the Case Studies and the essential business sustainability practices observed during the Case Studies.

Figure 5 below (page 55) depicts the systematic literature review timeline followed throughout the thesis process. The design was influenced by the work of Kauppi et al. (2013) and demonstrates how the factors identified throughout the systematic literature review and the business sustainability practices observed during the Case Studies influenced the evolution of the Conceptual Model for SMEs' business sustainability in high cost regions.

Figure 5 – Systematic Literature Review Timeline – Abductive Approach



Chapter 3 - Methodology

This chapter presents the methodology used during the research process. Section 3.1 is an introduction to the methodology selected, including the main research objectives, the research questions, and the justification of the case study methodology. It also explains how the philosophical posture of the researcher aligns with the approach selected. Section 3.2 presents the protocol followed, including the research framework. Section 3.3 shows the research process including participant selection, participant consent, data collection procedure, and the questionnaire used as guide for the interviews.

3.1 Introduction to Methodology

The methodology selected for this research is a multi-case study approach. This methodology could use both quantitative as well as qualitative methods (Meredith, 1998, p. 442). Kuhn (1971) proposed two broad approaches or philosophical frameworks: the positivism approach and the interpretivism approach or paradigm. During the research process, I was inclined to use mixed methods. Using interviews and observations to learn about a subject is typical of an interpretivist approach while using a semi-structured questionnaire to guide consistency and standardization can be viewed as a positivism approach. However, my philosophical position was ultimately one of interpretivism rather than positivism. As Farquhar (2012, p. 19) states regarding interpretivism, “The researcher is not a detached observer, as suggested by positivism, but an active agent in the construction of the world through the specific ideas and themes incorporated in the relevant form of knowledge”. The research methodology was designed in such a way to provide the necessary flexibility during the interview process, with a questionnaire designed with open-ended questions to allow participants to express their own reality and position, rather than restricting them to qualify an established position. The discussion very often provided the opportunity to generate other questions not included in the questionnaire, which allowed for richer learning and collaboration between researcher and participant about the participant’s position. This approach is described by Ponterotto (2005) as interpretivism, where the researcher and their participants co-construct the

findings from their interaction. The questionnaire used during the interview was intended to generate a dynamic discussion. The risk of using the questionnaire as an instrument to merely collect a response is that it could prevent the researcher from learning other perspectives participants might have which could only be explored during the discussion. Also, using a questionnaire before the interview, could bias participant responses.

Some of the methods and tools used during the research included the use of interviews, observations, and historical information such as financial and other business metrics. A case study methodology was selected in order to generate new practitioner thinking related to business sustainability rather than testing existing ideas. The need to answer questions about how and why (Yin, 2014, p. 9) and establishing causal relationships (McCutcheon and Meredith, 1993, p. 245; Stuart et al., 2002, p. 422) pointed to the use of case studies as the appropriate study approach to help create knowledge during the research. Voss et al. (2002, p. 209) proposed that one of the main advantages of this methodology is that it increases the chance to establish a cause and effect relationship between the factors and the subject being studied. Kuhn's paradigms for a case study research proposes that the research question that the interpretivism approach tries to address is the 'why' and 'how', rather than the 'what' question that the positivism approach tries to answer (Farquhar, 2012, p. 23).

The main objectives and research questions, which are the foundation of this research study, align with the interpretivism position I have taken and focus on the 'why' and 'how.'

Main Objectives:

- Study how small and medium-sized enterprises (SMEs) select business sustainability approaches that successfully make it difficult for Multi-National Corporations (MNC) to transfer work from them.
- Learn why SMEs select specific approaches over other approaches and how this impacts their ability to be financially sustainable.

Research Questions:

- How do SMEs in high-cost regions approach business sustainability?
- How does management knowledge, resources, and innovation impact the sustainability of SMEs in high cost regions?
- Why do managers in SMEs in high cost regions choose specific business sustainability approaches?

Sjoberg et al. (1991, p. 68) justified the use of the case study approach in sociology settings under two premises. First, even when the researcher uses a natural science model, he or she "must supplement their research with data collected via the case study approach" (Sjoberg et al., 1991, p. 68). Second, the authors contend "that the case study approach, based on in-depth fieldwork or documentary data, has an integrity of its own" (Sjoberg et al., 1991, p.68). The authors propose that a case study can be used to "examine a major set of problem areas relating to social interaction, historical processes, and organizational structures, doing much to advance our knowledge about significant social issues in the modern world" (Sjoberg et al., 1991, p. 68).

Saunders and Lewis (2012, p. 110) propose that there are three main types of study: exploratory, descriptive, and explanatory.

- The exploratory study is defined as "research that aims to seek new insights, ask new questions and to assess topics in a new light" (Saunders and Lewis, 2012, p. 110). Studies that typically use this approach are: searching academic literature, interviewing 'experts' in the subject, and conducting interviews (Saunders and Lewis, 2012, p. 110).
- The descriptive study is "research designed to produce an accurate representation of persons, events or situations" (Saunders and Lewis, 2012, p. 111). Studies that typically use this approach are: questionnaire surveys, sampling, interviews, and re-analyses of secondary data (Saunders and Lewis, 2012, p. 112).
- The explanatory studies are "research that focuses on studying a situation or a problem in order to explain the relationship between variables" and these types of studies take the descriptive approach a "stage further" by trying to establish "a causal

relationship between key variables" (Saunders and Lewis, 2012, p. 113). Studies that typically use this approach include: case studies, observation, historical analysis, attitude surveys and statistical surveys (Saunders and Lewis, 2012, p. 113).

The main reason case studies are the preferred research approach in this study is because it allows for an exploration of the causal relationship between business sustainability and the key factors identified during the literature review.

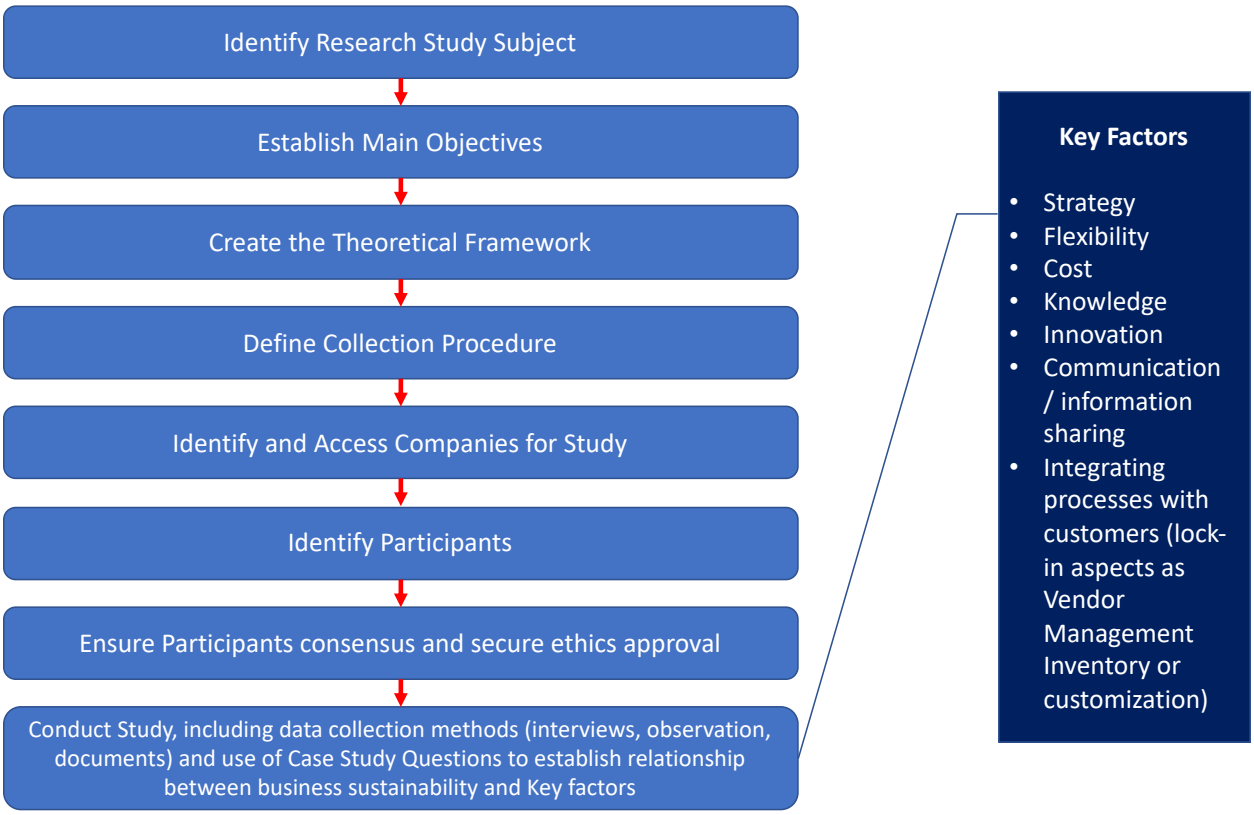
3.2 Case Protocol

To develop the case protocol procedure, various resources were used, including reference books from Remenyi et al. (1998), Hancock and Algozzine (2011), Farquhar (2012), Saunders and Lewis (2012), and Yin (2014). Also, various articles by McCutcheon and Meredith (1993), Meredith (1998), Stuart et al. (2002), and Voss et al. (2002) were used to learn about case study methods and its critical components such as construct validity, internal validity, external validity, and reliability, which were addressed through the design and execution of the Case Study Research process.

3.2.1 Protocol Overview

The following flow chart, Figure 6, page 60, represents the main steps of the research process and the factors related to business sustainability that were studied. These steps are subsequently further explained.

Figure 6 –Research Protocol



3.2.2 Research Title (Research Study Subject): Business Sustainability for SMEs Operating in High-Cost Regions

3.3 Research Process

- Researcher and Interviewer: José Muñoz-González, DBA student from University Of Liverpool, performed the fieldwork interviews, observations, and document collection. The ontological stance is ideographic (Farquhar, 2012, p. 17), which strives to capture and learn from the participants' perception of what their company does to create business sustainability and how their actions enable them to remain competitive. The case study approach provided an opportunity to connect closer with the participants and engage in direct discussion about what they felt to be important for business

sustainability. The in-person component provided the researcher an opportunity to read participants' body language, a task impossible to gain from a remote survey, which is typical of a positivism stance. An interpretivist epistemology was selected for the research, which involves the researcher and participants co-constructing the findings from their interaction (Ponterotto, 2005).

In the last 25 years, I have worked in different industries, including manufacturers of pharmaceutical products, medical devices, electro-mechanical devices, biotechnology products, and electronic products. My roles within these companies expanded throughout various functions, including production, quality engineering, materials management, factory management, operational excellence roles including Lean Manufacturing and Six Sigma practitioner. These roles, including previous education in industrial engineering, supply chain management, and business, have shaped my view and beliefs of manufacturing practices. During this study, I reflect on my previous learning and how I would have approached similar situations that the SMEs management approached.

- Targeted Interviewee: The interviewed personnel are in decision-making positions and can influence what business sustainability approach to follow. These included the Business Owner, the Operations Manager, the Supply Chain Manager, the Engineering Manager, or the Financial Manager. The intent was to have at least three employees per organization to help triangulate the information provided. Interviewing four participants from each organization and complementing the interviews with observations made during a site tour helped confirm the information provided during the interviews. This research was conducted in California, a high cost region, which helps inform how SMEs in regions like California are challenged by globalization and low-cost region suppliers, and what actions SMEs have taken to create sustainability. The definition of SMEs can vary from country to country or region to region. Paik (2011) researched extensively the different definitions of SMEs. He provided a comparison between SMEs in the USA and UK. The US Small Business Administration (2010) estimates that SMEs represent 99.7% of all employer firms and

employ about 50% of the private sector workforce. Similar economic impact can be found in the UK, where SMEs accounted for about 50% of the GDP and almost 60% of manufacturing employment (Paik, 2011, p.10). Paik noted the number of employees is typically used as one of the major criteria to define a SME. For instance, in the European Union, SMEs are defined as companies with fewer than 250 employees. By contrast, in the United States, SMEs often refer to those with fewer than 500 employees (Paik, 2011, p. 10).

3.3.1 Access to the right companies and people

The SME companies selected to participate in the study included companies that have being operating for at least eight to ten years in a high cost region. Start-ups were not considered, as they have not reached business maturity level and demonstrated an ability to sustain their business for an extended period of time. There are three partner organizations the researcher used to identify the appropriate companies for performing Case Study Research:

- Through professional contacts from the Supply Chain Management Institute (SCMI) of the University of San Diego, where the researcher is one of the board members. The approach was to request names of companies that met the SME definition and operate in California. The companies were not associated with the SCMI to avoid any conflict of interest.
- Through the Council for Supplier Diversity, an organization with Headquarters in San Diego and members from Southern California. This organization's mission is to help provide education and connections to minority companies to support their business needs. The approach was to connect with the members through the provision of training related to Value Analysis and Value Engineering, a service to this community. Companies were notified about the opportunity to participate in the study research.
- Through the California Manufacturing Technology Consulting (CMTC) organization, a not-for-profit company dedicated to improving manufacturing in Southern California. This organization was referred to the researcher by a third party who believed the researcher might be interested in learning more about the needs of these companies

for future solution proposals. The intent was to acquire access to the companies' owners, explain the purpose of the research, and eventually provide training in business sustainability approaches after the requirements of the research had been met.

The researcher identified more than twenty organizations as potential participants. Most of these organizations declined to participate because they were not willing to expose their internal information and processes. Others declined without providing a reason. The challenge of finding participants helps explain the timeframe from the first SME visited on July 2016 to the last one visited on May 2018. As a researcher, I am grateful to those companies that opened their doors to the research process and allowed me to learn about their organization, their people, and their processes.

My role as a member of the Institute of Supply Chain and alumni of the Supply Chain Management program provided me with access to professors and professionals in Supply Chain. They introduced me to some of the companies that became part of the Case Study research. Although some of the professionals offered to participate in the study, I respectfully declined due to the potential conflict of interest.

3.3.2 Ethics and Confidentiality

No financial transaction with any of the companies selected for the Case Study Research was done. The researcher did not pay any of the companies that participated in the research for access, nor received money in exchange for the research participation, the information provided, or the training offered as exchange for their participation during the research. The researcher understands that it is his obligation to assure the confidentiality of the companies and the personnel that participated in the research process. All participants were provided with a copy of the Participant Information Sheet (Appendix, Table B, pages 179-180), a document that explained the research study. Specifically, this document explained what the study is about, the purpose, the benefits for participants, and explained their participation was confidential. All participants agreed

and signed the Participant Consent Form (Appendix, Table C, page 181) after they confirmed reading the Participant Information Sheet.

Access to companies was mainly gained by professional connections through the University of San Diego. They provided names of contact persons, to whom I explained the purpose of the research. My professional contacts knew the Owner, President, or one of their top management for the company, but they themselves did not work with these companies. As part of the process to obtain their consent to engage in the research process, I had a call with them to explain the research process and secure their approval prior to visiting them. After they agreed verbally, we proceeded to schedule the visit. Before the interview, I explained again the objective of the research, their right to refuse to participate or to extract themselves before, during, or after the research process. During the phone calls, some companies declined to participate in the research process; only four agreed to participate.

One of the aspects that was of concern for most of the Owners or Presidents before the interviews was how to assure the participants' identity was not revealed, nor the name of the company. The signing of the Participant Consent Form seemed to put the company leader and participants at ease, as well assuring that the information was going to be used for educational purposes. As an inside researcher, I could have unintentionally influenced the participants' feedback. In hindsight, the face-to-face interviews could have intimidated the participants and affected their responses since they reported to the Owner or President who was also being interviewed, even though their names were not to be revealed during or after the study.

3.3.3 Data Collection Procedure

- Interviews: The researcher interviewed four employees from each participating organization. The interviews were planned for 45-60 minutes each, adopting a semi-structured approach to allow for flexibility to discuss areas not previously included in the interview plan (Stuart et al., 2002, p. 425). A set of reference questions were used

to assure consistency across cases in different companies, as shown below. The reference questions were intended to uncover the relationship between business sustainability and operational effectiveness, including factors found to be important during the critical literature review such as strategy, flexibility, cost, and knowledge. Other factors that were examined included innovation, communication, information sharing, and integrating processes with customers, including such lock-in aspects as Vendor Management Inventory or customization. A recording device was used by the researcher, with the consent of the participants, to assist in capturing the responses to questions posed during the interviews and to collect any additional information offered by the interviewees.

- Observations: For each site visit, the researcher requested a tour of the facility to observe any evidence related to business sustainability approaches in progress or previously implemented. These were granted in each case. Also, the researcher observed which metrics were posted, shared with employees, or used to run the business. These observations were intended to confirm the information provided during the interview and to help generate follow-up questions to better understand causal relationship of the factors impacting business sustainability.
- Documents and Business Metrics: The researcher requested access to various key financial statements and other business metrics from the last three to five years to observe if any relationship exists amongst the seven key factors, business sustainability, and business performance. The financial statements and business metrics requested included:

  Income Statement (P&L Statement)
  Balance Sheet Statement
  Cash Flow Statement
  Strategic and Business Plans
  Cost reduction projects and their performance
  Inventory management programs and linkage with customers and suppliers
  Evidence of product or service customization

3.3.4 Case Study Questionnaire

The questionnaire was intended to guide a semi-structured interview process and allow for cross-case comparisons. The participants did not have prior access to the questionnaire, as it was intended to be used only as a guide during the interviews. It was important to allow for flexibility of their answers and free sharing of their perspective. The discussion prompted other questions intended to expand or clarify the discussions. All participants were asked the same questions, and the responses were audio recorded. The responses were then transcribed into an excel spreadsheet for comparison and contrasting purposes. All SMEs were comfortable with sharing metrics during the site tours; however, only two were willing to provide multi-year financial information.

The questions below were used by the researcher to ensure consistency across interviews and cases. These questions were intended to help uncover any relationship between business sustainability and the seven key factors identified during the literature review. The questions were divided into two major groupings. The first group addressed factors that impact operational effectiveness, which is the area that was most frequently linked with business sustainability during the critical literature review. The second group of questions explored the level of understanding, use, and effectiveness of the SMEs as it relates to business sustainability approaches. The complete questionnaire is shown in the Appendix, Table D, page 182.

Condensed version from Appendix – Table D – Case Studies Questionnaire

Questions
1.3.1 Operational Effectiveness
1.3.1.1 Describe the major challenges your organization faces (Threats, Weakness and Opportunities).
1.3.1.2 How does your business strategy is aligned to address these challenges and how it ties to business sustainability?
1.3.1.3 How do you create flexibility to address changing customers, markets and government demands?
1.3.1.4 How do you manage cost?
1.3.1.5 How do you create and measure knowledge in the organization? What is the level of education of your leadership team?
1.3.1.6 What is innovation for you and how critical it is for your business? How do you determine the level of innovation needed for being successful in the market place?
1.3.1.7 How do you communicate internally and externally? How you measure the effectiveness of the communication?
1.3.1.8 How do you share information upstream and downstream the supply chain? How frequent and how extensive?
1.3.1.9 How do you integrate your process and products with your customers or suppliers? How effectively you use lock-in mechanism with customers (i.e.; VMI and Customization)?
1.3.2 Business Sustainability Approaches
1.3.2.1 Explain your understanding of business sustainability approaches such as Lean Manufacturing, Six Sigma, Sourcing/Negotiation, Value Analysis/Value Engineering (VA/VE), Theory Of Constraint (TOC), etc.
1.3.2.2 How did you learn of these business sustainability approaches?
1.3.2.3 Describe the business sustainability practices your organization follows. Provide examples (researcher to confirm with observations during the tour, if possible).
1.3.2.4 Explain the impact of these business sustainability approaches to your business. Link impact to business results, including metrics.
1.3.2.5 Why did you chose this/these business sustainability approach(es)? Alternatively, Why are you not practicing any business sustainability approach?
1.3.2.6 How these business sustainability approaches help you address your business challenges?
1.3.2.7 How did you learn of these business sustainability approaches?
1.3.2.8 Why have you not tried other business sustainability approaches?
1.3.2.9 How else do you create business sustainability?

Operations management theories such as Lean production and manufacturing strategy were developed through this research approach process (Voss et al., 2002, p. 195), and it is plausible that the learning from this research using a similar case study approach could expand the understanding of how SMEs operating in high-cost regions can create business sustainability.

3.4 Reflection about methodology selected

The methodology selected presented some significant learning opportunities and some challenges before and during the research. Before the research, it was a challenge to get SME Companies to open their doors for the research process, provided the process included face-to-face interviews and a site tour. Some of the SMEs that declined to participate in the research expressed concern of opening their company to a stranger. Others did not return calls, while others just turned down the request without explanation.

Being able to immerse myself into the research process and interact face-to-face with the participants and the rest of the personnel during the site tour provided me with great satisfaction as they shared with passion and energy the way they operate day-to-day. It not only felt that I was part of the research, rather than a bystander, but also provided hands-on learning of what the SMEs do to sustain their businesses. It was evident how proud they were of their success and passionate to share their story about the challenges they face.

In retrospect, although it might have been easier to design and send a questionnaire to many more SMEs and reach a greater audience, it would have not provided me with the opportunity to learn about the subject as deeply due to the follow-up questions generated during the interview process. Sending the questionnaire to many SMEs could have provided an opportunity to do statistical analysis, provided there was a sound statistical sample; however, I would have missed the opportunity to learn from the back and forth discussion, the participants' body language, and the face-to-face interaction.

Chapter 4 –Case Studies

4.1 Introduction to the Case Studies

During the research study process, a total of four SMEs were visited. Each of these companies had its own story of why it continues to operate in a high-cost region and why its business has sustained. They all have demonstrated their resilience and continue to operate in California, despite the continued impact of regulations, including minimum wage and rises in cost of insurance. The four cases are referred to as Case Study 1, Case Study 2, Case Study 3 and Case Study 4 and have been labelled based on the order in which these companies were studied. The purpose of studying multiple companies was to learn and compare their responses to the research questions:

- How do SMEs in high-cost regions approach business sustainability?
- How does management knowledge, resources, and innovation impact the sustainability of SMEs in high-cost regions?
- Why do managers in SMEs in high cost regions choose specific business sustainability approaches?

In all cases, access was provided to the highest person, the President, in the organization's hierarchy. For the first two, the President was also owner or co-owner, while for the last one, the President reported to a CEO of a parent company. The parent company of the latter is not involved in the day-to-day decisions, and it is a private company, not publicly traded. Four interviews were conducted in each of the companies, including one with the President and three direct reports. Below is a summary of the companies visited, the participants' role or position, and the business sustainability practices that has resulted in being in business for more than a decade.

Table 5 – Case Studies – Company Profiles, Participants and Business Sustainability

	Cases			
Company Info	**Case 1**	**Case 2**	**Case 3**	**Case 4**
Company Profile	The first company provides products to a niche market in the fish farming industry. It is an internationally recognized leader in the manufacture of biofiltration systems for aquatics research housing. A key component in aquatic research housing systems is the quality of the water, critical to animal health and research integrity. The Company has been involved in the revolutionary advancement of filtration systems and have innovated a filtering system that has since become the standard for the industry.	The second company provides metal fabricated parts and assemblies, mainly to the Utility and Gas industry. It serves some of the largest public utilities in the United States and has several large Original Equipment Manufacturer (OEM) customers in diverse markets such as physical fitness, aftermarket automotive, packaging, retail display, gardening tools, and other markets. Their processes include Computer Numeric Control (CNC) machining, metal fabrication, welding, and assembly.	The third company manufactures products for various industries, however, its main industry of focus is medical devices. It brings best-in-class technological and innovative rechargeable power solutions to the most demanding battery and charging applications, including thorough compliance with safety and environmental requirements. Some of their products include smart lithium-ion batteries, industrial battery packs, chargers, docking stations, vehicle cradles to power sub-systems.	The fourth company makes products for water waste and water treatment used in many municipalities. It is a leading manufacturer of chemical metering pumps, flowmeters, and water treatment accessories. The Chemical Metering Pumps and Flowmeters products offers various solutions to a diverse range of industries.
Participants	1. President / Owner (participant 1) 2. VP / General Manager (participant 2) 3. VP of Finance, Human Resources and PR (participant 3) 4. Sales Manager (participant 4) The last three participants report to the President / Owner.	1. President / Owner (participant 4), 2. Sales Manager / Owner (participant 3) 3. Engineering Manager (participant 2) 4. HR Manager (participant 1) The last three participants report to the President / Owner, although participant 3 share equity ownership.	1. President (participant 4) 2. VP / General Manager (participant 1) 3. Operations Manager (participant 2) 4. Purchasing Manager (participant 3) The last three participants report to the Company President.	1. President (participant 1) 2. VP Operations (participant 2) 3. General Manager (participant 3) 4. Finance Manager (participant 4) The last three participants report to the Company President.
Business Sustainbility	Company 1 has been in business for more than 30 years. Key practices for Sustainability are lock-in with customers via customization of products and solutions, and ownership of innovative designs that became the standard in the industry.	Company 2 has been in business for 13 years. Key practices for business sustainability are Continuous Improvement to be flexible to customer demand and reduce operational cost, lock-in with customers via design co-ownership, and diversification into other markets and industries.	Company 3 has been in business for more than 25 years. Key driver for business sustainability are Continuous Improvement to be flexible to customer demand and reduce operational cost, lock-in with customers by creating innovative designs customized for their needs, and diversification into other markets and industries.	Company 4 has been in business for more than 60 years. Key driver for business sustainability are Continuous Improvement to be flexible to customer demand and reduce operational cost, lock-in with customers via innovative designs customized to their needs, and diversification into other industries and regions.

The questions developed for the interviews were divided between operational effectiveness and business sustainability approaches. These questions were intended to ascertain if the key factors identified during the critical literature review such as strategy, flexibility, cost, knowledge, innovation, communication, and supply chain integration programs, including customization practices that affect business sustainability were also factors that emerged during the case study interviews.

The following is a recount of each of the Cases, including how the key factors identified throughout the literature review were manifested during the interviews' discussions and site tours. Quotes from the participants are provided to share their opinions, feelings, and concerns verbatim about the seven key factors and how their company approaches or embraces these factors. The companies' approaches are then contrasted in the discussion chapter.

4.2 Case Study 1

Company 1 provides products to a niche market in the fish farming industry. It is an internationally recognized leader in the manufacture of biofiltration systems for aquatics research housings. A key component in aquatic research housing systems is the quality of the water, which is critical to animal health and research integrity. The company has been involved in the revolutionary advancement of filtration systems and has innovated a filtering system that has since become the standard for the industry. Company 1 has been in business for more than 30 years.

Four interviews were conducted with the Company Owner / President (participant 1), the Vice-President / General Manager (participant 2), the Vice-President of Finance, Human Resources and PR (participant 3), and the Sales Manager (participant 4). The last three participants report to the Company Owner. The following is the learning related to the key factors for business sustainability: strategy, flexibility, cost, knowledge, innovation,

communication, and Supply Chain integration programs and customization practices, including where the participants agreed, differed, or were concerned about these factors.

After studying this Case, it became clear that no overarching strategy for sustainability was in place, nor a process to develop one. Also, no consensus emerged as to where the organization should focus for business sustainability. The two main areas of concern identified were inventory management due to material shortages and project management affecting the timing and cost of their product development. These are processes the team is working on because they are affecting their ability to ship products on time to customers and to lock-in product design. The strategy development process should aim to address these issues to ensure they do not affect their ability to lock-in with customers and earn repeated business.

During the facility tour, I observed that they could generally benefit from a 5S process, as established in any basic Lean Manufacturing program, as well as pull systems to better manage parts availability and inventory levels. Also, a formal and structured Value Analysis / Value Engineering process, combined with a Sourcing / Negotiation strategy could help the company to achieve the owner's vision to double their profitability in three years.

When examining the company's financial performance and reflecting on its business sustainability approaches, including customization of products and ownership of innovative designs, I noticed the company needs to engage in an approach to help it reduce its operational costs through the use of continuous improvement and material cost reduction practices. Profitability Ratios measure the ability of a company to earn a return on sales, return on total assets, and return on the capital invested in a satisfactory way (Tuller, 1997, p. 52). The profitability trend in the last three years is far from the Owner's aspiration of having at least a 10% net income as a percentage of sales and 30% growth in three years. The following are the Profitability Ratios for the last three years.

Table 6 – Case 1 Profitability Ratios

Profitability Ratios	2014	2015	2016
Gross profit / sales	0.393	0.385	0.366
Net income after tax / sales	0.005	-0.008	0.003
Net income after tax / total assets	0.022	-0.024	0.009
Net income after taxes / equity	0.030	-0.047	0.018

As can be observed in the above ratios, the company is barely showing a return on sales, total assets, and equity, or capital invested. This is not satisfactory to the Owner's current goal of at least 10% return on sales. The trend of Gross Profit to Sales ratio shows a declining trend in the last three years, down 7% from 2014 to 2016. The net income for the company had been less than 1% of Sales for the last three years, with 2015 showing a negative result. This level of profitability is concerning, especially in light of the Owner's immediate goal of 10%.

The Company Owner / President and I met a few times after the initial interview to discuss the possibility of helping him develop a strategy to reduce material cost, which can help the company's financial position and support its growth strategy. I agreed to help at no cost, with the intent to use this learning as a transformation process that can be used as part of the thesis work. Bessant et al. (2005, p. 4) recommend that interventions in a firm intended to help the firm grow must be through providing the firm knowledge that they can utilize and hence should be aligned with the firm's absorptive capacity, or the ability to absorb and use the knowledge. Their research points to external knowledge inputs as a factor that can influence business performance.

In a meeting held with the Owner on March 2017, the researcher shared how to go about undertaking a supply segmentation and how to organize a Request For Quotation (RFQ) in a systematic way, through aggregating volume and classifying parts into commodities or categories. On July 2017, I followed up with the President / Owner regarding the information shared at the previous meetings, and he informed me that the recommendations had been implemented. The owner was very appreciative of the

knowledge shared of how to generate the supply segmentation and how to aggregate the information for RFQ. He mentioned that the latter was key to their successful quotation process and achieving cost savings. This intervention during the research study was an example of action research, where one can observe improvement at the SME due to a change in process driven by sharing knowledge and innovating the way activities are undertaken.

The following is a recount of the learning of the seven factors selected from the literature review and any additional aspect the four participants thought was important to mention during the interview process. This data collected from each participant helped construct the Case, including how each participant addressed the same questions from their own perspective.

4.2.1 Strategy

It was evident that a company-wide strategy was not in place. The President / Owner expressed that this is something he can use help with and was looking forward to recommendations that the researcher could provide.

Below are some quotes from participants as they relate to the company's strategy.

- Participant 1, Company Owner / President, accepted that this is one of the areas they are looking for help from external interaction. "So, one of the things I'm doing as I'm working with the local group called the chairman's Roundtable, and they are retired business executives that are offering some coaching so that's a short-term's six-month commitment on their part. I will be doing a preliminary presentation with them next month and then a final presentation with them the next couple months and so I ask them this question so I'm seeking out hopefully some expert coaching which is also one of the reasons I was willing to take on this project, because I hope I get some coaching back on that."

- Participant 2, Vice-President / General Manager, mentioned the fact that he is wearing various hats, due to absorbing the work of another employee who left the company, and that his focus is on improving their planning process and material availability challenge. “We have a lot of issues on the floor with planning production and the blueprints. A lot of time there are errors and getting it corrected is a priority. The second thing I'm doing is researching how much we use of certain items in a year, and I look at what sometimes our lead times are on the stuff, the items, and double it basically, set up reorder points and reorder quantities, and I just got to keep doing that.”

- Participant 3, Vice-President of Finance, Human Resources and PR, mentioned the importance of continuing to strategize with how they do marketing and trade-shows in their outreach to their customers; however, it was not evident how this is engrained in their strategy. She also mentioned the challenges with limited resources due to being a small operation: “I just continue to strategize with how we do our marketing and our trade-shows in our outreach to our customers to keep the sustainability going and as that applies to other aspects of the business I think I'm kind of talking more along all the marketing part of it, but we continue to try to strive for new resources when we get to a brick wall with our supply chain. We don't have like a large company that has a supply chain manager. We have a purchasing officer, and we have other people in departments, maybe in engineering or maybe in production, who are constantly searching for things that we need for a product.”

- Participant 4, Sales Manager, mentioned that the most important thing is that the company has not decentralized responsibilities to help reduce the bottleneck: “I guess the most important thing hasn't been addressed and that is how to decentralize responsibility throughout the company so that there are bottlenecks and that has not been addressed, and I don't see it

being addressed." This seems to align with one of her comments during the interview about how the company has not moved from a garage, small business mindset, to the next level. Although this is not a strategy embraced by the organization yet, she wishes that it becomes so in the future.

4.2.2 Flexibility

It was evident through the interviews and the plant tour that the company was not systematically practicing Lean Manufacturing, Six Sigma, Theory of Constraint, Value Analysis / Value Engineering, Strategic Sourcing, negotiation process, or any other business sustainability approach. However, since the initial visit, it has attempted to implement a more structured approach to reduce cost by formalizing an RFQ process.

Below are some quotes from participants as they relate to their approach to creating flexibility.

- Participant 1, Company Owner / President, spoke about adapting a product to a different market need related to endangered species as a way to be flexible within the market place. "We have taken some of the equipment that we've designed for that and put it into the other markets, one being the Fish and Wildlife department for maintaining the endangered species because of the drought, so I don't know that I've actually gone out and found the business as much as our reputation has brought business to us, so I think that it is been based on just a lot of hard work, and people knowing us, like I said, is a lot of old long-term, old relationships that I built upon which is exactly why taking on a whole new industry would be very difficult."

- Participant 2, Vice-President / General Manager, shared that sometimes it can be a challenge to have a flexible operation to support customers' needs due to material availability, but he strives to make the process efficient to

support those needs. “Okay, what I do when I have my general manager hat on, I come up with monthly work plans, in other words, all the jobs that we have and what we are planning on shipping we group similar jobs and components, so that it is more efficient to make one thing five times than to make five of them one time. I schedule around what is really hot for this month, who needs it first that will sometimes show my direction, sometimes try to be flexible, but your restricted by procurement and on bizarre stuff this is very fast turnaround we get a job and usually it's shipped within two months and sometimes a lot less than that. So sometimes the ship date is established for when I can get everything in, process it, tested and be able to confidently ship it.”

- Participant 3, Vice-President of Finance, Human Resources and PR, spoke about the need for diversification. However, she recognized the need to stay within their core competencies. She spoke about providing an example related to software that was not successful. It was an attempt to support some customer needs and to diversify the business, but she felt it was outside of their capabilities. “Two, three years ago we tried to diversify into something that we shouldn't have and we have learned our lesson the hard way, in this case it was software for our customers and research labs to keep their census of all of their animals and we learned the hard way how deep your pockets have to be to develop something like that and we ended up pulling the plug on it, but after we had spent enough like maybe $250,000 on the development of it with no return so we have to try to diversify, but stay within our core capabilities, within our manufacturing and not go too far outside of that where you don't have the resources either financially or technically to do certain things.”

- Participant 4, Sales Manager view was that for the most part, their orders are customized and this shows that they are flexible to adapt to the customers’ needs. She provided the same example as the VP of HR, PR

and Finance, related to the software product, which was not successful. She felt that it was out of their capability, and even when they team up with a software company, it was not the right one. “We are manufacturers of aquatic systems and one of the things we try to do is develop a software system for tracking the fish and the maintenance, and we are not a software company, and even though we hired a software company, we picked the wrong one and we didn't manage the project well. So that take a lot of money and a lot of time and it did hurt us a lot.”

4.2.3 Cost Management

Cost competitiveness is a key aspect for SMEs operating in high-cost regions to compete with low-cost region suppliers. Controlling or reducing their operating cost can be a factor that enables them to remain in business or go out of business.

Below are some quotes from participants relating to their approaches to managing cost and their cost reduction focus areas.

- Participant 1, Company Owner / President, mentioned that their focus is more on increasing price, rather than reducing cost. He mentioned that they have weekly meetings to discuss shipments and will speak about the financials but considered that not much focus is on the cost side. “Well I don't know that we really do, ok. I think that with such a small business that's hard for us to do. We only do a one-time year inventory, a lot of that is just having people in the know that keep an eye on things. We do a weekly production meeting, we do talk about cost, and we do talk about the business as far as shipments and the bottom line on a weekly basis.”

- Participant 2, Vice-President / General Manager, mentioned that he will do bid packages to get lowest price from suppliers, and will use blanket orders to bring material as they need it, taking advantage of quantity discounts.

"When I came here, we were going to one place and the price kept going up. So, I started to make it a bid package and submitting to suppliers, and they bid on it and they all bid to the same spec and sometimes it can save you $0.10 a foot sometimes it can save you $0.80 a foot by 10,000 feet in the small company, that's a lot of money." Also, he mentioned that implemented a pre-production meeting with various departments to reduce errors from their production units, eliminating waste by not doing things twice. "We have a lot of issues as we have our engineering departments always being young, and their experience is not that high, a lot of mistakes happening while we are building stuff, so out of frustration, I came up with what I call a preproduction meeting, so planning is completed, then they are ready for us to start building. We have a meeting that is represented by people from engineering, manufacturing, and sales."

- Participant 3, Vice-President of Finance, Human Resources and PR, shared that they look into both cutting the expenses and increasing the prices, including asking vendors to sharpen their pencils and controlling travel expenses, such as per diem and tips. "There are you know a lot of different things along the way keeping your costs down on your per diem's when people travel, looking for, you know, decent hotels. But keeping those costs down, explaining to your people the reasons why tipping protocols, all the way down to those per diem's, and trying to reinforce them." She mentioned that for the first time they ask their employees to contribute to the premium of their health insurance. Also, she mentioned that they try to offer products with parts purchased from the USA. "We do buy a few products from overseas such as electronic stuff but we do pride ourselves in providing our products that are made in the USA and working with vendors in the USA." This could contribute to higher material spend.

- Participant 4, Sales Manager, thought that the company is micromanaging cost, where they involve three managers to discuss $30 expenses, or the

president needs to approve a $30 shipping expense. She thought this increases cost, rather than reducing it. She also mentioned that the bureaucracy is just adding cost, as sometimes they need various employees to be involved in generating a requisition that then translates into a purchase order. “We have some guidelines but everything has to be discussed at the top. There are no things down on the floor that people feel comfortable making these decisions. For the $30 shipping expense you need to talk to the president, and that's costing, you know what I mean, that's costing us money to do that. So, it's not efficient. To get an order written, one person writes requisition, one person writes purchase order, one person reviews it all. It's just this multiple layer of bureaucracy.”

4.2.4 Knowledge

Knowledge is another aspect that emerged from the literature review as an important element for business sustainability. During the interview, I learned about the leadership team’s level of education and experiences that influence their decision making, but more importantly, I learned how they enable knowledge, including creating, capturing, and disseminating knowledge throughout the organization.

Below are some quotes from participants relating to their approach to knowledge creation and dissemination.

- Participant 1, Company Owner / President, shared that the way he creates knowledge in the organization is through weekly production meetings. In this meeting, sales figures, status of orders and financial information is shared. “We do have our weekly production meetings, and we go over every job, on top of that we do go over the sales figures for the quarter, the Sales Manager, who you will talk to later will share the sales figures so that the other managers know what's going on.” The level of education for the team

includes personnel with a college degree and others without a degree. The degreed employees are mainly in engineering and biology.

- Participant 2, Vice-President / General Manager, shared his perspective that the organization creates knowledge through the use of Standard Operating Procedures (SOPs), the use of on the job training including training installers to undertake technical support, external training from equipment representatives. “We try to do a lot of SOPs. We tried to, some is, of how people start in the shop, they start on the basic, most basic, like in the plastic filtration shop. They may start at the most basic level and has their task increased or their understanding and their quality increases we keep adding tasks. We do it in for other groups, our installer groups, there's a lot of in-house training.”

- Participant 3, Vice-President of Finance, Human Resources and PR, stated that knowledge is created through on the job training and the use of external resources. Also, in some instances they might have employees go to external training. She provided various examples, such as Sales training and HR workshops. In addition, she mentioned that they use California Chamber of Commerce Seminars as a way to provide training to employees. In addition, when hiring personnel, they will use a Work Style Assessment Test, to assure employees are a good match to the role and the organization. “We do in HR, workshop four times a year. We do formal sales meetings two times a year. We have an outside resource who has trained all of our sales people in a formal training situation. For particularly that position or any high-level position we have another outside resource for background checks but it's not necessarily just what you think about as a background check it's work style assessment, personality code testing to ensure that the people are going to be able to work together well with the key people that are already here.”

- Participant 4, Sales Manager, agreed that various trainings are provided to technicians as well as to salespersons. “So as far as knowledge, we have training sessions for things like our technicians to get trained, our salespeople get trained, and that can somewhat be measured based on the program.” However, I was concerned that even when people might have knowledge to resolve a problem, needed to ask for permission to act. “So sometimes it's difficult for us to use the knowledge we have because we do feel we need to ask permission to do it, and so even people who have a lot of knowledge sometimes don't use it.” She felt there is a lack of empowerment to employees. Employees proving technical support were typically too cautious, when they could have resolved the problem by themselves.

4.2.5 Innovation

Although most participants agreed on the need for innovation, they were concerned about how to innovate and how to overcome some of their challenges to innovation.

Below are some quotes from participants relating to their approach to process and product innovation.

- Participant 1 (Company Owner / President) expressed that innovation could be a struggle due to the economic impact and the turnover of key personnel in engineering. He cancelled a large project due to not having the right resources, as these resources left to other companies to pursue new job opportunities.

- Participant 2 (Vice-President / General Manager) shared that he does not have much interaction with customers to learn their needs, although some of his employees have participated in trade-shows and seminars. The company offers seminars in which they learn their customers' next product

generation needs. Also, they use networking and trade-shows to benchmark what their competitors are doing.

- Participant 3 (Vice-President of Finance, Human Resources and PR) mentioned that they use consultants to help with product design and development, however, she also shared that sequestration had an impact on engineering resources, and believe that the company should be doing more about innovation.

- Participant 4 (Sales Manager) believe that innovation is critical for them, especially because the industry they operate in has matured significantly when comparing to many years when they started. She expressed that they tried to innovate by themselves and did not do a very good job. Although she believes it is imperative to innovate, her concern is the company does not know how. She felt they need help in this area and no plan is in place at this time. As it relates to the level of innovation needed, she believes that is an ongoing discussion in the organization.

4.2.6 Communication

During the interviews, it was clear that the management team put a lot of effort into communication. The participants shared the different ways they communicate internally and externally.

Below are some quotes from participants relating to internal and external communication.

- Participant 1 (Company Owner / President) shared the various ways they communicate internally, including meetings set with engineering, with sales, with the installation team and the weekly production meeting. Also, he uses e-mails and one-on-one meetings with employees, as needed. He felt that this is an area that could be improved. He shared during the interview that

there are people in his office all day long discussing projects. Participant 1 also mentioned that he does not have much communication with suppliers, unless there is a problem. He spends about 2 to 2.5 hours a day doing e-mails, mainly with clients and with employees.

- Participant 2 (Vice-President / General Manager) shared the use of a tool they call the Turtle. He uses this tool as a way to drive actions to resolve problems. It includes what the problem is and who is driving action to resolve it. He stated that it was difficult to measure the effectiveness, however, this tool served as a way to communicate and resolve issues internally. Most external communication with suppliers is done through e-mail. On occasions, he might visit a supplier or the supplier might visit the site. Participant 2 does not communicate much with customers, but spend time communicating and following up with suppliers. In some cases, suppliers will visit the company or infrequently he might visit a supplier. He expressed that when performing a bidding process with suppliers, he will not share information of other suppliers with their competitors.

- Participant 3 (Vice-President of Finance, Human Resources and PR) expressed that most communication are done through e-mail or phone calls. However, mentioned other ways they use for communication such as: Monthly newsletter, social media, website, shopping cart, trade-shows, brochures, seminars for external people, meetings, including production meetings and face-to-face meetings. Participant 3 also shared that they have someone on call all the time for providing customer support and they use computerized electronic monitoring devices to track customers' system performance. Also, they have developed a customer issue escalation process, combined with daily reports and alarms that the technical support team will review and act as required. One aspect that she felt they could do and is a missed opportunity is to charge for the customer support

provided, especially when they are monitoring their systems and informing them when adjustment is required in their system.

- Participant 4 (Sales Manager) agreed that most communication is through e-mails and phone calls. Also, that there are lots of meetings, including production, engineering and sales meetings. She agreed with participant 3 that other communication tools they use include newsletters, websites, shopping carts, and trade-shows. However, she shared a communication mechanism not brought up by others called pipeline deals. This tool helps to track customers' conversations and requests. One of the challenges she sees is that on occasions there could be miscommunication, as more than one person could be working independently on a specific customer issue, providing the customer with different and perhaps contradicting information. They do production meetings to discuss the status of customer orders. Also, she uses a suggestion box to incorporate people's ideas into processes, however, she is not sure if others are using it as well. Participant 4 mentioned that occasionally they visit customers and when installation of the product is required, their installers will communicate with customers face to face. They provide training to their installers in how to communicate with customers. She was concerned that information related to purchase orders for parts was not easily available in any system or job folder, as she used to have in her previous employer. They use a customer questionnaire to survey performance, and although the return rate was 6%, she thought it was usable information for acting on. For example, one of the feedbacks was that their product's manual was very poor, and the company hired a technical writer to address this issue.

4.2.7 Supply Chain Integration Programs and Customization Practices

All participants shared from their perspective how they integrate their processes or products with customers or suppliers. This included ways they engaged with suppliers or customers, and how they lock-in with the latter.

Below are some quotes from participants relating to supply chain integration and customization practices.

- Participant 1 (Company Owner / President) shared that they make many things, which requires technical support. "Preventive maintenance contracts are a growing opportunity for this organization. We are dealing typically with research doctors and the nature of the business, they do not want to deal with variability of the equipment." The organization own their design, but customers are involved in the design stages, and might include customization. He feels that design and engineering solutions for customers are not cost effective. Their focus has been more on the manufacturing side than in service. However, he felt they might have the greatest opportunity in service. Also, he thought that for some materials, particularly molding parts, they lock-in with their supplier, as they depend on them to deliver products.

- Participant 2 (Vice-President / General Manager) main focus related to supply chain integration on the suppliers side rather than with customers. He will release purchase orders ahead of when they are required, based on forecasts, to ensure he has the material he will need for customers' needs. By buying materials and building ahead, he felt he could save money for the company, while reducing lead time for customers' products. They use blanket orders with suppliers, which seems to be a way to lock-in with their suppliers, at least while blanket orders expire. He shared that for plastic parts the prices continue to be going up because of oil prices. He does not deal with customers, so was not able to share examples of how they integrate or create lock-in with their customers.

- Participant 3 (Vice-President of Finance, Human Resources and PR) expressed that the service they provide to customers to monitor their system performance is a way to integrate their process to their customer needs. She mentioned that their products are very complex and are customized based on their customer needs. In addition, one key aspect of their relationship with customers is that they will be invited to visit them in order to help fix problems they have with their competitors.

- Participant 4 (Sales Manager) expressed that the consumables included in the initial product offering to customers are not locked-in, as customers could buy these in other places. However, they make it easy for customers to buy from them the consumables and provide technical support to help with their immediate need. She felt that they do a bad job in inventory management, which can have an impact on customer orders because some materials are special and have long lead times. She felt that there are lock-in mechanisms in place with their customers for products, but not for consumables.

4.3 Case Study 2

The second company provides metal fabricated parts and assemblies, mainly to the Utility and Gas industry. Company 2 serves some of the largest public utilities in the United States and has several large Original Equipment Manufacturer (OEM) customers in diverse markets such as physical fitness, aftermarket automotive, packaging, retail display, and gardening tools. Their processes include Computer Numeric Control (CNC) machining, metal fabrication, welding, and assembly. Company 2 has been in business for 13 years.

Interviews were conducted with the Company President / Owner (participant 4), the Sales Manager / Owner (participant 3), the Engineering Manager (participant 2), and the HR

Manager (participant 1). The last three participants report to the Company President / Owner, although there is a split ownership relationship between participant 3 and 4. The following is the learning related to the seven key factors for business sustainability, such as strategy, flexibility, cost, knowledge, innovation, communication, and Supply Chain integration programs and customization practices, including where the participants agreed, differed, or were concerned about these factors.

After studying this Case, it was evident that the culture of this organization is one founded on continuous improvement. Their knowledge and engagement of the Toyota Production System or Lean Manufacturing, used interchangeably throughout the interviews, was continuously being brought up as the key to their success. During the plant tour, it was evident that this has become entrenched in their day-to-day operation and it is what the company uses to remain competitive and create a sustainable organization based on flexibility and lock-in with customers. They have implemented manufacturing cells to flex based on customer demand and have implemented Kanban as a pull system. The implementation of 5S and standardized work was noticeable throughout the shop. They have implemented a standard board to track performance on meeting customer demand. Although their strategy was not well crafted, they all agreed that their main concern is that they are heavily invested in one specific industry: Utilities. They mentioned that their near future focus is to diversify into other industries and to continue developing their own products so they can serve a broader customer base. In addition, although not a formalized process, they shared projects they have undertaken related to Value Analysis / Value Engineering and the initial stages of Strategic Sourcing and Negotiation to support their profitability.

When reflecting on their operational practices and their financial analysis, it seems the company is well run and managed and that the management team has created a business sustainability process that seems to be effective. During the interviews, participants attributed their financial performance to their Lean Manufacturing approach. The Profitability Ratios measure the ability of a company to earn a return on sales, total assets, and the capital invested in a satisfactory way (Tuller, p. 52). The profitability trend in the

last three years is positive. The following are the Profitability Ratios for the last three years.

Table 7 – Case 2 Profitability Ratios

Profitability Ratios	2014	2015	2016
Gross profit / sales	0.411	0.448	0.436
Net income after tax / sales	0.087	0.116	0.180
Net income after tax / total assets	0.411	0.309	0.487
Net income after taxes / equity	0.622	0.481	0.641

As can be observed in the above ratios, Company 2 shows a positive return on sales trend, more than doubling its profitability from 2014 to 2016. Although the return on total assets and return on equity have dipped from 2014 to 2015, they had their best year in 2016. This performance was attributed by the Owner and the other three participants to their embracing of a Lean culture, where everyone is engaged on process improvement, including the personnel in the manufacturing shop and in the office. This is a good example of how the organization has embraced continuous improvement as a way to create business sustainability.

The following is a recounting of the learning of the seven factors and any additional contributions the four participants thought was important to mention during the interview process. The data collected from each participant helped construct the Case, including how each participant addressed the same questions with their own perspective.

4.3.1 Strategy

The strategy of the organization is founded on being the problem solvers of their customer base through idea-generation, continuous improvement, and flexibility.

Below are some quotes from participants relating to the company's strategy.

- Participant 1, HR Manager, shared the following perspective, “Our business strategy, basically is we try to educate our customers, which we also call our partners. They are not so much our customers, but they are our partners. Most of the time they understand that is important to have their products made in the USA. Also, in my opinion, one of our biggest assets or part of the strategy is continuous improvement. So, by making sure that there is no waste of either time or material and the continuous improvement activities on the floor, we will make sure that we keep our prices down and still have a profit.”

- Participant 2, Engineering Manager, opinion was that their strategy was an ever-evolving thing. “There are some core tenets that don't change, continuous improvement is what the company is built on. It is the core, we focus on continuous improving and that helps with a lot of challenges. Is the foundational element. Beyond that, Sales strategy, we are trying to still figure out.”

- Participant 3, Sales Manager, shared that their main focus was in the public utilities sector, mainly gas. He went on, “So of our pie of a hundred percent pie, we’re probably around 85 to 88% public utility gas, and then we have OEM and the balance made up by a little bit of electric as well. So, in the strategy we have is to be a little bit diverse, to expand our offering into a larger portion of the OEM market so that we’re not so vulnerable if there is an economy downturn.” For participant 3 the need for the company to diversify into other industries was important.

- Participant 4, Company President / Owner, perspective about strategy was focused on expanding their customer base. “Get some more customers in, diversity. Our goal in 5 years is to be, I mean, well, our goal at the end of our 5 years plan, which we’re about a year into, so we got 4, 3.5 to 4 years to go with that, is to, by at the end of that, to be half utility, half non-utility,

half OEM so we're a little more diversified." Diversification was a key aspect participant 4 mentioned to be essential for their business.

4.3.2 Flexibility

Company 2 was founded with a Toyota Production System or Lean Manufacturing philosophy. According to the interviewees, the Lean Manufacturing practices allow the company to be flexible, shortening their lead time to days, compared to weeks from some of their competitors.

Below are some quotes from participants regarding their approach to creating flexibility.

- Participant 1, HR Manager, described his perspective about flexibility as, "We just need to keep on top of it and constantly we are involved with different organizations. We are very close to our customers. Participant 3 is in sales, but we all have a relationship with our customers, we call them partners. Specially the utilities, they will come and tell of, if they need something different or they did not like something we did. We are very open with them and they do not need to go through three different levels of management. They basically can make a phone call and is done. I think by having a close relationship with our partners, and also making sure we keep our self-informed by being involved with different organizations and the industries and professionals that will also help us and give us advice." Voice of the customer and learning from different organizations are key aspects from his point of view.

- Participant 2, Engineering Manager, opinion was that they are flexible due to being nimble. He shared the following: "We do not have a long history of doing things a certain way, having detailed procedures in place of how things have to be done, so we are pretty good at being flexible and adapting

to customers' needs quickly." From this participant point of view, being nimble is key to success.

- Participant 3, Sales Manager, proposed that flexibility was tied to their supply base. "Yeah, we're only as good as our suppliers. So, we have to embrace, and a lot of people say without a customer, you're nothing. I don't really believe that. Everything is intertwined. If you only take care of your customers and you don't care about your suppliers, you're not going to have customers. Relationship will only get you so far. You got to perform, as we all know, so I think, and it also includes our facility and the people who work for us, those are our partners as well. So, I mean it just, for long term sustainability, we have to pay equal amount of attention to all three major segments, your supplier base, you're in the box, for lack of a better term, and your customers. That's a great question. I think it's one of the reasons we're in business. We have taken the approach, not to steal somebody else's thunder, we are truly problem solvers for our industries and our customers, from the oil and gas to the utility business, we have developed, with our customers, products that is pretty exciting for us right now."

- Participant 4, Company President / Owner, shared that creating processes that make them flexible is their success. "We basically try to establish low cost, right size processes that meet our customer's exact demand. And I think by taking that approach, it's a very different approach, I think, that a lot of places take. I think we're able to, when an opportunity comes, and it looks like a good opportunity, we don't have our capital tied up in some big machine that we haven't sold capacity to yet. We can establish smaller right size processes and meet a customer's demand. So, I think that is a huge one. And that really is something that's a lot different."

4.3.3 Cost Management

Competitive prices are a key aspect for SMEs operating in high-cost regions to compete with low-cost regions' suppliers. Controlling or reducing their operating cost can be a factor that enables them to remain competitive or go out of business.

Below are some quotes from participants regarding their approach to cost management and their cost reduction focus areas.

- Participant 1, HR Manager, proposed that a good relationship with suppliers was essential to their success. She shared, "We manage cost, we have a good relationship with not only with our customers, but also with our vendors. Also, with cost being extremely efficient and avoiding waste, we also give the employees the freedom to come up with improvement in their specific role." Her perspective was that shop floor personnel engagement in continuous improvement is a key factor for improving their operational cost.

- Participant 2, Engineering Manager, main focus was on controlling operational cost, including "watching the overtime, making sure we are not working overtime unnecessarily, but at the same time, when it makes sense, whether because sales support it or we want to devote people to run improvement activities as we grow, be more efficient, be more cost effective." He expressed the importance to team up with their suppliers to reduce cost. "Some of it is just relationships, making sure we got good vendors we are comfortable with, that we can trust to provide us a good price. Sometimes we just go on to do research, for something we are paying this much for seems like a lot. Go out, spend the time find that you can buy something as half as much or a third as much of what you were paying." In addition, his perspective was that manufacturing personnel engaging on continuous improvement in the shop floor is one of the key aspects to be cost effective.

- Participant 3, Sales Manager, proposed that teaming with suppliers was key to manage their cost, and shared that they “try to look for suppliers and we are a small company, so we don’t have a lot of weight, and we can’t demand these metrics in cost reductions, but we, even though they may be small suppliers, some very small, we still engage in dialogue. We have them come in here, we sit down with them, we talk to them about the long-term goal that we’re trying to do, and how our goal as a company is to grow and become a much larger company.” His perspective was that working with suppliers on material cost and sharing company’s direction and growth plan was one of the approaches he felt was important to control cost.

- Participant 4, Company President / Owner, took a more structured financial approach and shared, “ We review the company financials and go through it and see if anything stands out from that perspective. I think, from a more day-to-day point of view, we all talk quite a bit about, and have an awareness of the cost of things. So, we try to communicate to the guys in the shop, but if they make a mistake, it can potentially be pretty impactful in a negative way. So, we make sure that we all are aware of the negative cost impacts of making mistakes, making quality issues, having a quality issue, having an injury, and those kinds of things.” He also shared the importance of investing in people to reduce cost. “The other thing that I think sets us apart from a cost point of view is that we are willing to make the investment for the guys to work a couple of extra hours to create an improvement that will result in future costs savings.” His perspective was that the manufacturing personnel engagement in continuous improvement was a key aspect to cost savings.

4.3.4 Knowledge

During the interview, the participants shared the leadership team’s level of education and experiences that influence their decision making, but more importantly, the participants

shared how they enable knowledge creation and dissemination throughout the organization.

Below are some quotes from participants regarding their approach to knowledge creation and dissemination.

- Participant 1, HR Manager, shared that the way they create knowledge is through on the job training or offering to pay training or higher education to their employees. She provided an example of an employee who went and took courses conducive to a CNC certification. “We also encouraged our employees to take courses for higher education. We had a very young gentleman here. He started with us when he was 18 or 19. He was very encouraged, and he went and got his CNC certificate.” This allowed him to be promoted and get a salary raise. Also, she mentioned that every morning the management team members meet with the shop floor team to discuss the results of the day before and if someone proposed an improvement that was a great idea, they would share with others.

- Participant 2, Engineering Manager, mentioned that how they create knowledge starting with a morning meeting every day with the shop guys, "trying to educate them." They spend time in their core values, which "ties to lean manufacturing and continuous improvement, making sure they understand the mindset." He expressed that he does not know if they have any formal system adequate to creating knowledge.

- Participant 3, Sales Manager, shared that they encourage their employees to get additional education, and that some of them take advantage of the offer. “For a lack of a formal training system and formal education we send our guys, we encourage them to go and some have taken us up on the offer.” Also, he mentioned that they discuss their values on a daily basis

with their employees and encourage cross training among them. However, he accepted they lack a formal system for creating knowledge.

- Participant 4, Company President / Owner, shared that they do not have a formal training program. However, every morning they meet and discuss what they are doing and use it as an opportunity to learn. For example, if during the day someone came up with an improvement, they will call everyone to show the improvement so they can share the knowledge. Also, the use of Kaizen events is another way they learn, by sharing not only the improvement, but "sharing what do the people that were involved in the activity learn from it."

4.3.5 Innovation

Below are some quotes from participants regarding their approach to process and product innovation.

- Participant 1, HR Manager, point of view of innovation is more from a process stand point than from a product. This goes to the essence of the company's main mission to being a contract manufacturer to their customers in the Utility sector. "Innovation, I think, our business would be how we run our business, how we run our shop. Efficiency in the shop and the type of tools we use in the shop. Because we are not creating, I mean, we have our products, none of them are very innovating."

- Participant 2, Engineering Manager, expressed "we are not like a cutting-edge technology company...out in the shop, looking for innovative ways to do things." His perspective is also one of process innovation, rather than product innovation. They strive to come up with better ways to make things, "eliminate a few pieces or simplify it." This is the essence of value analysis / value engineering, simplifying and reducing the cost of products. Also, he

mentioned they implemented an electronic board on the shop floor to show customers' orders priority and their completion progress.

- Participant 3, Sales Manager, shared some of the areas the team have innovated, including their phone system, the electronic production board to show the schedule and progress, and the new CNC equipment they invested in for manufacturing parts. He mentioned that some of their customers consider them to be innovative and problem solvers; "Hey, you guys are the guys, the problem solvers. You are the innovators of this industry, you are the only one with new products."

- Participant 4, Company President / Owner, expressed, "We are not a high-tech company. We don't do any rocket science here." However, his perspective is that from a process stand point they are pretty creative and that their customers consider them creative as well. "Those are the go-to guys if you really, if you have got a problem, go to them. They will develop a tool, or they will develop a process, so they will come up with something creative to help." He provided an example where a couple of engineers from one of their biggest customers visited them for two and half days to design a product they needed right away. They co-patented the design and are producing it for their customer. He felt that creativity and innovation is "one of the major components of our success."

4.3.6 Communication

Below are some quotes from participants relating to internal and external communication.

- Participant 1, HR Manager, shared the way they communicate internally and externally. Typically, internally is just a face-to-face, at their desk or a conference room. Also, once a month the staff meet to go over the business performance, including sales, open orders, new customers, travels, HR and

Marketing, AP/AR, Operations, Engineering designs and IT stuff. She mentioned that External communication is typically done by Sales Manager (Participant 3) and the President (Participant 4), and it includes face to face meetings at the customer site or the company, and phone calls and emails. She mentioned that she feels the communication with customers is effective and "it shows because we have a great relationship with them." Participant 1 expressed that they share information through trade-shows, marketing materials, website, emails and calling customers.

- Participant 2, Engineering Manager, provided another perspective on how they communicate internally, such as the use of drawings and documents so the employees know what to do. Also, the electronic board he implemented is another tool they use to communicate with the employees the priorities for customer orders. The use of visual management is another tool they use to make it easier for employees on the shop floor to know what to do. On occasion, when needed, they will bring shop floor employees to the office to "explain things to them and if clear they are not getting it, we do not do it much, but occasionally writing them up." They also created an employee handbook this year to communicate expectations. For office employees, due to proximity, "just talk across the hall." Also, for office management group, "we have monthly meeting, our key indicators, talk how we are doing and what we have coming out." Externally, with customers, he mentioned that emails are a big part of the communication. However, with customers, face-to-face interaction is huge and that the Sales Manager (Participant 3) is in front of the customers a lot. He also mentioned that they launched a website, and that is still in the works. Participant 2 expressed that for suppliers they typically communicate through email and phone calls as needed, pretty much continually.

- Participant 3, Sales Manager, mentioned that for internal communication they do morning hurdles, every day for about 15 to 30 minutes. It is intended

to communicate what they are doing, and what is the plan for the day. They will discuss any change in plans, based on the customer needs. He will provide a quick summary of the good things that are happening with customers and if something needs to be fixed. Externally, he shared about their website, and concurred with Participant 2 that there is still work to do. In addition, he mentioned that he spends a significant amount of his time meeting face-to-face with customers, almost every day. If not, he will be on the phone talking to them. He believed that the face-to-face communication and interaction with their customers gave them an opportunity to learn about new programs and ensure there was alignment with their needs. With suppliers, he felt it is an area they can do better. They try to communicate where they are headed, including their goals. Also, he will provide them with an introduction to some of their customers so they can expand their business, without competing with each other. Some of their suppliers will do the same for them. Participant 3 expressed that they share information with suppliers over the phone and also visiting the suppliers. For customers, he "like to be in front of the customers as much as possible." He will also use email and phone calls.

- Participant 4, Company President / Owner, shared the way they communicate internally, starting with the information they put on the wall (board), which gets refreshed every 15 minutes for everyone to see. Also, he mentioned about their morning meetings, and how they share new orders, new contracts or customers, things that are going well and the things that are not. In addition, he spoke about their monthly and quarterly meeting, where they will share the business results. One key aspect he mentioned they cover during the quarterly meeting is the profit sharing based on the business results. Participant 4 expressed that with customers they have a great relationship due to continuous communication. The communication is by phone or face to face. "We get together and we

develop a product together." For vendors is one of the areas he felt they need to formalize the sharing of information.

4.3.7 Supply Chain Integration Programs and Customization Practices

Below are some quotes from participants relating to supply chain integration and customization practices.

- Participant 1, HR Manager, shared that they do not have an ERP/MRP system. The way they lock-in with customers is by building “stuff for different groups inside the same customer”, which make it more difficult for the customer to move away. They also will engage in design with some Customers and in one case co-patent a device. One of the key factors to keep customers is by providing great customer service, on time delivery and open communication.

- Participant 2, Engineering Manager, opinion is that their service and flexibility are key factors at providing lock-in. They practice vendor management inventory with their suppliers, more alike stocking program for finished goods. They customize parts for various key customers and they own the drawings.

- Participant 3, Sales Manager, believes that their very short lead time, due to stocking of finished goods, is a differentiator with contractors that also do work for their customers. This enables the contractors to do efficiently the work required for their mutual customers, this "solved the headache for the utility, really provided this outstanding service to the contractors." Also, he mentioned that they provide custom products, which provided a good margin to the company.

- Participant 4, Company President / Owner, provided an interesting perspective, where they understand the specification and are able to offer alternative materials. This aligns with value analysis / value engineering philosophy. In addition, he mentioned that some of the products are customized and that they provide a stocking service, something that their customers have not been accustomed to in the past.

4.4 Case Study 3

The third company manufactures products for various industries; however, its main industry of focus is medical devices. Company 3 has over two decades of manufacturing expertise in portable power innovation of smart batteries, chargers, and docking stations. The company brings best-in-class technological and innovative rechargeable power solutions to the most demanding battery and charging applications. It serves as an extended engineering arm for electrical and mechanical expertise and maintains thorough compliance with safety and environmental requirements. Some of their products include smart lithium-ion batteries, industrial battery packs, chargers, docking stations, and vehicle cradles to power sub-systems.

During the visit, interviews were conducted with the Company President (participant 4), the Vice President /General Manager (participant 1), the Operations Manager (participant 2), and the Purchasing Manager (participant 3). The last three participants report to the Company President. The following is the learning related to the key factors impacting business sustainability, including where the participants agreed, differed, or were concerned about these factors.

After studying this Case, it was evident that the culture of this organization is founded on continuous improvement, mainly using Lean Manufacturing and practicing a cellular manufacturing approach. Their knowledge of and engagement with Lean Manufacturing approaches was continuously being brought up as the key to their success. During the plant tour, it was evident that Lean Manufacturing, including manufacturing cells and 5S,

had become embedded in their day-to-day operation and utilized to remain competitive. Other sustainability approaches practiced by the company that were mentioned included Six Sigma and Value Analysis / Value Engineering. No systematic approach was evident during the tour, nor was it corroborated across more than one participant. However, a key element the company used to lock-in business for many years was by engaging with new customers in the medical device industry through product validation and leveraging their medical device expertise.

During the facility tour, it was observed that they generally follow a well-structured 5S process. They have the assembly area arranged into manufacturing cells; they practice pull system, Vendor Managed Inventory, and Consignment to better manage parts availability and inventory levels. Although not a systematic process in place, they engage in material price negotiation with suppliers to support their profitability. Material price negotiation and supply segmentation could be included in their annual strategy process as a strategic sourcing process that will help reduce operational costs.

The president mentioned before the visit that he will not be able to provide financial statements because of their parent company policy. They are a privately-owned company, not publicly traded, but the parent company owner is sensitive to sharing information about sections of the company, which is run independently from the parent company. However, he was able to speak at a high level on how they are performing. Their gross margin is about 25% of sales and profit is approximately 5%. He mentioned that although they have improved about 0.5% per year on profit in the last few years, they have not seen the full effect of their Lean efforts because of regulation fees, including California minimum wage increases: “The increase in minimum wage in January cost us $92,000.” Also, he expressed that the increase in insurance due to the Affordable Care Act is having an impact on the company’s financials and the employees: “Insurance went up substantially with the Affordable Care. We passed on some of that to our employees. So, they’re paying more than they were, but so are we. Our cost went up significantly with the Affordable Care Act.”

Participant 4, the President, mentioned that there are other areas they needed to continue focusing on for reducing cost: “After gross profit comes, the cost of sales, variance from standards, scrap, rework, overtime, all those things are other cost of sales and they account for about 10% of cost of sales.” This might represent an important opportunity in the short term and should be addressed from a strategic stand point. However, their approach to continue leveraging their medical device expertise to qualify and validate new products supports their long-term objective to lock-in business which makes it difficult for customers to move away.

The following is a recounting of the learning of the seven factors and any additional aspect the four participants thought was important to mention during the interview process. The data collected from each participant helped construct the Case, including how each participant addressed the questions from their own perspective.

4.4.1 Strategy

The organization’s strategy is founded on collaborating with their customer base on design customization through idea generation and providing products at competitive prices by maintaining costs down through continuous improvement and flexibility.

Below are some quotes from participants regarding the company’s strategy.

- Participant 1, Vice President /General Manager, mentioned that they target specific markets and customers. "We are identifying the markets and the customers in those markets that we want to go after, so we target those customers and there are certain conferences or trade-shows that we’ll participate in to try to cast a net to meet some of those people." Key to their success is to understand those customers’ requirements. "We have to keep abreast of what those changing, evolving requirements are and making sure that we are adapting and getting those capabilities in-house for our customers." He also mentioned that Lean Manufacturing and flexibility are

key to their success. "Setting up your manufacturing structure so that it is Lean and flexible to meet the customer's manufacturing requirements, production requirements."

- Participant 2, Operations Manager, shared that his perspective was that automation and a multi-skilled workforce could help on reducing their operational cost. "So the only way that I can cut down on time, in head count, is to look at mechanisms to automate some of the processes that back in the old school days were done by hand. I have to have multi-talented skill sets, and I also have to have automation to help me achieve the path that our company has chosen."

- Participant 3, Purchasing Manager, mentioned the company's approach to reduce material cost is by sourcing both locally and off shore. "We do source both in the USA and off shore, depends on the end application. Some of the medical customers we will source in the USA. Other asset tracking or other products that we would build and support for those industries we will source overseas and how we sustain it is by doing the audits and going overseas."

- Participant 4, Company President, shared that their strategy is more related to the customers and markets they go after. "We have specifically gone after medical because once you get designed in, you are going to have them for a 7-10 years life. You are not going to change the product frequently. They will keep their design for a longer period of time. That enables us to, over time, help reduce our cost and help reduce their cost. Because they expect price reductions every year, not price increases. So, we have gone after medical, medical specifically."

4.4.2 Flexibility

The President started in this company more than a decade ago. He joined the company with vast experience in manufacturing and in Lean Manufacturing and came from running a larger organization. The company started to embrace the Lean Manufacturing philosophy upon his arrival, as expressed by the other three participants throughout the interviews. The Lean Manufacturing practice allowed the company to be flexible, shortening their lead time to days, compared to weeks from some of their offshore competition.

Below are some quotes from participants regarding their approach to creating flexibility.

- Participant 1, Vice President /General Manager, shared the importance of flexibility with customers and suppliers, and how internally they use a cellular arrangement to flex up or down based on customer needs. "Usually our manufacturing or supply agreement with our customer is the flexibility that they want built into that supply agreement. Then you just have customers that, for us, we have determined what are the core capabilities that we need to have in our manufacturing facility here so that we can have a level of elasticity, if you will, or that flexibility that gives us that ability within a short period of time, the flex to meet the manufacturing demand. Then that also feeds back into how do we manage our supply chain, our suppliers that have that flexibility. We have brought in SMT in-house, which can be a long schedule process, so that we have that flexibility at the printed circuit board level, which is a key component going into our products then the final assembly flexibility and having cellular technology set-up within the manufacturing so that we can adapt if we have one cell building a product."

- Participant 2, Operations Manager, shared the importance of creating cells that can be easily replicated for flexibility. "Flexibility, I try to make what we call our working cells as mirror image as possible. So, let's say I get customer A to buy double the amount that month instead of the normal amount, then I can just have a second team work on the cell instead of

trying to go to overtime, which costs money, which hurts the market, obviously, that is been built into the product. Or I also try to be able to use a second shift versus the overtime." He also shared how the president, participant 4, brought the Lean Manufacturing approach to the company; "He implemented Lean Manufacturing and the 5S program, which, I worked with the president for 20 something years, so I know the benefits." He also shared the possible consideration to low-cost region suppliers in order to remain competitive; "I would say, probably, another 5 years from now, if not sooner, the batching process that we have today would be something we would want to look to go to Mexico."

- Participant 3, Purchasing Manager, provided his perspective of how having engineering done locally also contributes to flexibility as well as creating a new line based on the demand needs; "Flexibility for us, I mean, it's kind of what we are good at by manufacturing local and having a lot of our customers being in USA. We can adapt to change pretty quickly. We have a lot of the design support in-house, so if we want to do something, we are walking down the hall, not going to another country or another state even, for that support." He also recognized the importance of manufacturing in house and the ability to arrange a new line or cell; "Also having, not only the design side but the manufacturing side under the same roof, if we need to, we can cut into a line and start a new line, do a switchover if they want to reduce an order or expand it, we can do the planning on that side. In the way we do the material flow, we usually, for a contract customer that has a supply agreement, we have the pipeline set up to allow for spikes, if that happens."

- Participant 4, Company President, reinforced the importance of flexibility to compete with off shore companies. "One of the things that we can sell is our flexibility. If you had the same offshore company, not only couldn't they react in a short period, it would take them six weeks to react to a doubling

of volume. It would take them six weeks to get it here because they have got to ship it by boat. That's where we really compete, is flexibility. We are willing to carry inventory for our customers. We buy at a forecast. We have supply agreements with them. So, we kept that business, even at a higher price, because of flexibility and the willing to carry inventory."

4.4.3 Cost Management

A key aspect for SMEs operating in High-Cost Regions to compete with Low-Cost Regions' suppliers is cost effectiveness. Controlling or reducing their operating cost can be a factor that enables them to remain in business or go out of business.

Below are some quotes from participants regarding their approach to manage cost and their cost reduction focus areas.

- Participant 1, Vice President /General Manager, provided his perspective of how the company is managing its cost; "Not as well as we should. Not as well as we would like to. For us in particular, because we kind of look at a cost and go through reviews, you have the macro-level that you kind of look at overall to components that you are buying going into multiple products. Then you have the micro-level where you have unique components and products that you have to build that's unique to that particular product. So, how we manage that internally here is that the supply chain people are looking at, and they have their cost target objectives to reduce cost across the board." Another aspect he shared was how they manage their internal manufacturing cost. "The other aspect of that is not just your material cost but what are you doing on your manufacturing or your productivity cost, those all take monitoring, take consistent monitoring that's got to be driven from senior management of what those expectations are, down through to the staff management, functional parts of each area of our organization."

- Participant 2, Operations Manager, shared what is his focus when managing cost, including scrap and labor overtime; "Well, number 1 is scrap. Number 1 is scrap. I monitor scrap on a daily basis. Then I have a team, what we call the scrap team, the Tiger team, to look at scrap. We try to do the 5 Why's to get it down to the root cause. Overtime, obviously, as I mentioned before, is a killer because even with the temp agencies, because we flex with temp agencies all the time. I do watch overtime. I do watch head count, and I do watch scrap. That's the way I manage cost." His focus is in material and labor efficiencies.

- Participant 3, Purchasing Manager, proposed that the key aspect the company does to manage cost relates to material, including pricing and inventory stocking aspects such as space saving. "We will look at material cost, I'm guessing is what you are talking about. We will do multiple things. We have automated ERP systems that we actually supply the forecast to the suppliers so that they can see and they can plan and then we will work on EAU pricing. We will do contract pricing. We will do Kanban agreements with suppliers where they will build it and hold it for x amount of time and ships to us and allows us to get a quantity discount while still taking it monthly, so the cash flow is still there and you don't have the carrying cost or the inventory space of it."

- Participant 4, Company President, provided his perspective on how they manage cost, including focusing on labor productivity. However, he felt they could do more to manage cost. "Not as well as we should. We know what the labor should be on a particular product. We have measured takt times. We have measured production per day. So, we know if we can build 400 a day or 600 a day. We also design for manufacturability. So, in our new product development process, we have manufacturing engineers in those meetings. Test time is another thing. We work to the parameters of the board, what all do we have to test, and how can we get the test time down."

4.4.4 Knowledge

Knowledge is another aspect that was explored during the study. During the interview, the leadership team shared their level of education and experiences, which could influence their decision making, but more importantly, they shared how they enable creating, capturing, and disseminating knowledge throughout the organization. The president has been a significant enabler of the organization's knowledge as it relates to Lean Manufacturing. This was confirmed by all participants in the interview process.

Below are some quotes from participants regarding their approach to knowledge creation and dissemination.

- Participant 1, Vice President / General Manager, shared how the organization links internal processes to creating knowledge and how they will encourage employees to receive external education, including master programs and certifications; "How do we develop, we have SOPs set up for all of our processes by which we would go about doing anything from entering an order to how something gets shipped, transaction going out to the customer. So, then in addition to your SOPs, you have training guidelines and then there is the intangible of just assessing your employees. When you get into engineering, what are their talents, what do they need to do, so then you determine what could be additional training that could be provided to those employees that would bring them up in their skill levels, so that is more of a manager role in the company, that making sure that they are assessing and bringing their employees along. Some of that is encouraging people to continue their education, and we have that going on with a number of our employees that we tell them, 'Ok, proceed with your masters. Get your masters in this area'. If you are a program manager, get certified in program management so that you start to learn the best practices

in the industry. We will help subsidize those education and the cost of getting the education done."

- Participant 2, Operations Manager, mentioned that they provide technical and non-technical training to their employees, both internal and external; "We do have some training courses. We do get people certified. We have our own in-house, even though he is not technically in-house; he lives in Arizona. We do in-house training on ESD, which is a big killer for some of our PC boards on the active components. Then we do some in-house training on even at the supervisor level on things that you can do as a supervisor and things you can't do as a supervisor."

- Participant 3, Purchasing Manager, provided his perspective of how he measures his team knowledge through goal setting process, including setting some type of target that they can measure. "So, the knowledge of the organization, if you are talking about my group of people and not the whole company. So, there had to be goals set, typically you want a goal to be something that has a number to it that you can actually evaluate, whether it's a cost savings goal in general or it can be a cost savings just on freight."

- Participant 4, Company President, shared how they create knowledge through internal and external training, including on the job training for many different aspects. "Gain experience in the job they are doing. We do a lot of in-house training. A lot. I have lead training next week, and in the lead training, we are going to talk about what do you expect from your employees, what do we expect from you. Talk about the 5S organization. Talk about safety. Talking about wage and hour of questions, so that they are capable of answering those questions for the employees. So, we do wage training, supervisory training. We have done OSHA training. We have done supervisory training. We have done ISO training. Sometimes

we have outside people, sometimes we do it inside. But we are continually working to upgrade people through training."

4.4.5 Innovation

Below are some quotes from participants regarding their approach to process and product innovation.

- Participant 1, Vice President / General Manager, provided his perspective about what innovation is for the organization, specifically focused on process rather than product innovation; "Since we say 'A charge with innovation' underneath our company name, innovation is constantly thinking how, in my mind, of how things could be done better to improve upon, and that is just consistent with our philosophy as a company to continue process improvement, and it could be simple things, but there is innovative ways to how things flow through your company, and that is just if you are going through terminology, 'leaning out' your organization with what you do. It could be how you respond to a customer can be innovative. Customers come in, they help us innovate just by their observations and things that they see. So, we look forward to those, to use that as learning for ourselves. How I would answer that in engineering, would have certain things specific to engineering of how are we keeping abreast of the technology, and the products that we build."

- Participant 2, Operations Manager, shared what innovation is for him and how it relates to the company; "Innovation for me, honestly, is to try to do more with less. If I put it in a nutshell, how can I achieve satisfactory numbers to satisfy our customers, and actually the goal is actually to exceed their satisfaction. You have got to put a lot of focus on it. You can solve today's problems, but you have always got to be thinking ahead, because if

you don’t, it will come hit you in the back of the head, and then it might be too late to react."

- Participant 3, Purchasing Manager, provided his view of what is important to the organization from an innovation stand point; "The overall goal, even, is to get the cost down and to get the manufacturing here. For me, I like the business for what we do and getting the design and the hands-on with it and growing that business and keeping it here in the states. To me it’s interesting knowing what the product is and where it goes and how we play a part in that. I think you have to be creative and you want to, for lack of a better word, grow in that marketplace.”

- Participant 4, Company President, shared the influence that customers have in the innovation process and the importance of continuous improvement. "Our customers dictate much of our innovation. By their specifications, they tell us what we have to meet. We don’t go out and make sure that every product meets every spec because now you are over designing and over building. So, we try to only meet the requirements of their specific custom product, meeting the specs our customers require of us, and improving cost through continuing process improvement. We look at markets, not products, and we look at the technology. Meeting the specs our customers require of us, and improving cost through continuous process improvement."

4.4.6 Communication

Below are some quotes from participants regarding internal and external communication.

- Participant 1, Vice President / General Manager, shared how external customer and internal management communication is handle as well the feedback of their performance to metrics they measure. "I would start using

the metrics that we establish for, throughout our manufacturing processes to what is our first yields of the manufacturing floor, through test, assembly. What is the feedback we get as we meet twice a year and walk through all that, we set those parameters as to where do we assess that we can start doing better. We get customer feedback about our engineering processes when we release new products to our customer. That's a separate survey than just an ongoing annual survey at how are we taking care of that customer in the sustaining mode. Customer feedback is excellent at telling us things where we can be improving in terms of tweaking the processes and where we think we might be doing really good." He continued to add; "At the management level, our president has at least quarterly reviews with all the employees, and that's usually done as a minimum walking through each area, in each department, personal communications with small groups of people sharing where the company is, what the company is doing overall, so the employees feel like they are in touch with what is occurring. Usually once a year, we do that in a more formal approach in a presentation mode, and that's usually around the end of the year, of course, with this being the end of our fiscal year as to how we have done for that year, new customers that we have gained, new applications we are going into. How we measure that feedback is probably something we could do a better job of. That's the only way I can answer that. We do somewhere like 40 plus internal audits a year of just making sure we are following the SOPs and the processes." Participant 1 also mentioned how the company share information; "From a sales umbrella to overall supply chain, we have monthly reviews, formal reviews, where we look at the forecast across the board for all of our customers, and we review that with both planning and purchasing as to what is happening and do we see trends and that enables them to do their planning. That meeting becomes our formal communication process other than if there are customer meetings that could be in between those meetings, then those are usually emails or customer reports."

- Participant 2, Operations Manager, shared how communication is done, both internally and externally. "Internally, I communicate in person. I don't believe in a lot of emails. I try to do a face to face thing. There's a lot in body language. There's a lot in tone of voice, and I do that a lot. I do communicate to the folks. In fact, we have a weekly meeting, on the floor, with a TV set behind us. We do a Power Point, talking about last week's success, the productivity. Then we do a meeting at the end of the month. So, I believe, I see a lot of benefits in this type of communication. I see a terrible issue if you don't communicate. I hate email to be the only thing to be put out there. Because email has its place too. I do like to do a follow up, an in-person follow-up. Externally, yeah, it's probably heavier on the email side of everything. I try to place a phone call to talk and sometimes, email is the only way to go." Participant 2 spoke about the different meetings they use to share information; "We have our every Monday staff meeting, plenty of meeting that are specific for different things, so, we have our MRB meeting. Weekly, we have an ECO meeting, where we talk about the current ECOs, and we talk about the maintenance side of suppliers. I usually have them come in because I want to see who I'm talking to."

- Participant 3, Purchasing Manager, shared the different ways they communicate, particularly inside the company. "Most forms would be, the standard one would be email. There are definitely the conversations that take place in different meetings, follow-up meetings, I mean follow-up notes from the meetings are important to document it. But most times it's going to be emails. With my group, I will meet with them whether it's weekly, or depending on what it is, it might be monthly." Participant 3 also share the ways and frequency and method of the communication; "Most communications externally will be email. Email's not always the best approach. There is a, you do have to pick up the phone, call them, and as I mentioned before, especially overseas, there's big emphasis on the relationship being face-to-face really helps out. It's daily. Yeah, so you are

always going to be doing the day-to-day stuff. If you are working on a project with one customer on something, it's at least weekly. Overseas, we tend to make about three trips a year. WebEx type go to meeting programs. If it's possible, we do try to source a lot of material. When I say local, I say on the west coast where we are located so you can actually just go to that supplier and work on it."

- Participant 4, Company President, shared how he communicates across the organization and the level of meetings he will be involved with; "We have quarterly employee meetings with all employees, and I tell them, 'Here's how we did last quarter. Here's our plan for this quarter.' We generally will bring up a safety issue. We will bring up a new customer to let them know our products are saving people's lives. So, we communicate quarterly with all employees. I have weekly staff meetings and meet with my staff every week. We go through anything that's current and we have a meeting every other week on corrective actions, internal corrective actions and supplier corrective actions. The other thing we do is audits." Participant 4 also discussed how they use report cards with customer and suppliers as a way to share information; "With our customers, many of them give us report cards that tells us, here is how we are doing and we get a grade score for customer service. We have been ranked as a preferred supplier within the last five straight years. So, we get report cards from our customers. If we don't, we keep track of all of that same information, and we send it to our customers, say, 'Here's our quality. Here's our on-time delivery.' And we let them know 'Here's how we did.' We do the same thing with our suppliers. Not only do we do an approval to go through approving a supplier, we send them report cards. If they are a critical supplier, which is generally anything that's built to print, we will audit them. We will give them a report card."

4.4.7 Supply Chain Integration Programs and Customization Practices

Below are some quotes from participants regarding supply chain integration and customization practices.

- Participant 1, Vice President / General Manager, provided his view of how the company try to lock-in with customers. "The most value that we add when we lock in processes with our customers is to establish a contractual agreement or supply agreement that clearly defines what their expectations are, what our expectations are that we agree upon, and how do we manage, then, their production to build process. Their cost is largely driven by the watt size in which they are manufactured, but on the build to print items within a given product SKU is what can really drive our cost, and it's also what can drive our lead times as well."

- Participant 2, Operations Manager, shared his perspective of lock-in, or the lack off in some cases, from his perspective. "We do have an NPI process. A new product introduction process that works very good with customers from the get-go. So, whether it's on the actual workings of the, either the battery or the charger, or the, what do you call that, the cosmetic side of it. So, we do work hand in hand with the engineering group. There are weekly calls with many of them for the program managers, so we don't go too far down the wrong path. And we do integrate with them to make sure that when we do get to the end, because it is kind of a long road at times, especially medical products, that when we get to the end, it's a satisfactory end for them as it was for us. I don't think we ever lock them in, to be honest with you. Usually, they own the IP, so, sometimes, it's 50/50. I would say, you can never really control someone from going off. A lot of our customers, we create the spec. So, they will give us the X, Y, Z, the basics and then our guys take it, and they create a spec that goes step by step. You are locked in maybe at best 90% of the design, and then there's always that 10% that they feel like, they are paying the bill. They are the customer.

Come in at the ninth hour, tweak something. I don't think there's any lock in my opinion, there's no locking in. No solid locking in anyway."

- Participant 3, Purchasing Manager, shared how they would do VMI with their suppliers, mainly to reduce inventory and to improve availability. "We have a few different VMIs where they will come in and they will actually stock on the floor or in a different location, a quarantine location. We also do a lot of consignment inventory, and that one we even pipeline. We run a lot of it through the consignment program. For component, it's about 50%." During the discussion it became apparent that the lock-in process approach they follow with their suppliers help them to better support their customer need, especially short lead time.

- Participant 4, Company President, shared his perspective of how they lock-in with customer from the design stand point. "So, we design to meet the customer's spec. They are involved in the approval. They approve the preliminary design review. Then we have 3 different design reviews. Design review 1, 2, and 3. By 1, we have done preliminary designs and we may have built prototypes. By design review 2, we have done a pre-production run. They have to look at all of the different design and say, 'Yes! This is what we wanted. Yes, this meets this particular parameter. And yes, you could proceed.' Design review 3 is, OK. Drawings are done. Training is done. Tooling is done. We are ready to go into production. So, we work together with them. Nothing that we do is on our own. Nothing is standard. It's all to meet their spec. And that's good, even though we start with a blank sheet of paper. We have done the design to where if they were to try to go to somebody else, that person would have to start with a blank sheet of paper. Yeah, we generally don't give them the design. And even if we do, we have got proprietary information, like software that's built in. Our test fixtures, all of our proprietary software in them."

4.5 Case Study 4

The fourth company visited makes products for water waste and water treatment used in many municipalities. Company 4 is a leading manufacturer of chemical metering pumps (diaphragm, peristaltic), flowmeters (variable-area, paddlewheel, ultrasonic), and water treatment accessories. Their Chemical Metering Pumps and Flowmeters offer various solutions to a diverse range of industries. Company 4 has been in business for more than 60 years.

A total of four interviews were conducted, which included the Company President (participant 1), the Vice President Operations (participant 2), the General Manager (participant 3), and the Finance Manager (participant 4). The last three participants report to the Company President. The questions developed for the interviews were divided into two sections addressing operational effectiveness and business sustainability. These questions were intended to uncover if the key factors identified during the critical literature review are also factors observed during the case study interviews. The following is the learning related to the key factors to business sustainability and where the participants agreed, differed, or were concerned about these factors and business sustainability practices.

After studying this Case, it was evident that the culture of this organization is one where the leadership connects very well with the rest of the organization. They care about learning, through formal and informal ways, including sending employees to external training, bringing training in-house, and assigning books for reading. The participants clearly communicated that flexibility to customers' needs and innovation were essential to their business and that as they grow going forward, it is important not to lose what made them successful. Participant 3, the General Manager, expressed the importance of innovation for the organization: "Innovation is one of our core values of the company, and we have seven of them. In order to work here, you have to believe, you have to really believe and live the seven core values, which are passionate, innovative, teamwork,

helpful, integrity, reliable, and respectful. Being innovative isn't just for engineers. It is for every level in our company."

Although it was evident that the company practices Lean Manufacturing techniques, one of the aspects they considered important going forward was the integration of all the functions through a new management system. The General Manager expressed: "We implemented a new management system that kind of broke down all the barriers and got everybody out of the silos to create accountability." They were concerned about their accelerated growth and thought that a new management system would provide a standardized process to sustain growth.

During the facility tour, it was evident that the company follows a well-structured 5S process; for example, they arranged their production area into manufacturing cells. The President expressed the importance of continuous improvement to the company performance: "I feel like the Lean and then the, whatever you want to call it, Lean Continuous Improvement, Six Sigma, they are all related, is the most important thing to us right now. I mean, we are a manufacturing company. It has to be woven in everything we do." The President, who personally conducted the tour, was also sharing some of the features of their products and how he felt that they provided differentiated products in the market place. He expressed that their engineering focus was key to their success so far and going forward. The establishment of a new R&D department is one of the key initiatives he personally is driving, as he believed that designing customized products for their customers was essential to their business success.

A request was made for financial statements. The President mentioned during the visit that he will think about providing financial statements. None were provided. During the tour, he spoke at a high level about how they are performing. He mentioned that their profit is double digits and the company continues to grow in an accelerated manner. However, he is concerned with California's cost of living and cost of operating, and he expressed how he takes care of their people, so it is essential that they continue to practice and learn about Lean Manufacturing: "So we are really trying to think of new

ways to do things, especially in California. I tell everybody, the cost of living is so high that we have to pay, and I'm not complaining. We want our employees to be able to afford a vehicle to drive to work and be able to feed their families, so we are not paying minimum wage here at all, you know? But for that, we need to keep Lean." He encourages employees to learn about Lean and provides them with an economical incentive: "I'm going to give every person that reads a book on Lean a gift card for $100." The General Manager was aligned with the President on the importance of the Lean approach and expressed how the management team engages everyone on this practice: "I think I mentioned earlier our entire group has been affected by our Lean approach. You can't really pigeonhole it, but it takes support from the top, from top management, to make sure that we are all in with this teaching and understanding and to push the process along."

The following is a recount of the learning of the seven key factors and any additional contributions the four participants thought was important to mention during the interview process. The data collected from each participant helped construct the Case, including how each participant addressed the same questions with their own perspective.

4.5.1 Strategy

The strategy of the organization is founded on being nimble by being flexible and innovating based on customers' needs.

Below are some quotes from participants regarding the company's strategy.

- Participant 1, Company President, mentioned that their strategy is about being flexible while they innovate to meet customers' needs. He was concerned that as they grow and become more structured, it affects their ability to be flexible. His strategy is to create a new R&D department, to allow creativity and flexibility as he expressed: "Now we are going to be creating a new department and that's going to be an R&D department and that's our way where we can, I guess, enforce our systems and processes,

but also allow to have the flexibility of coming out with new products, new ideas."

- Participant 2, Vice President Operations, shared his perspective that their business strategy is to ensure they deliver solutions that align with customers' needs. He expressed: "To deliver solutions by building reliable products that enhance quality of life. So, our process is to listen to our customers first. So, by listening to our customers first, we can ensure that we are growing in the right direction." His point of view is that the team focus is to listen to customers need, and provide solutions that align with those need.

- Participant 3, General Manager, mentioned the company's approach to new management system provided a way to align all functions. The strategy here was to ensure the team was focused on addressing the business need. He shared: "We implemented a new management system that kind of broke down all the barriers and got everybody out of the silos to create accountability in these specific positions, and those are all the key functions of our company and with that, we were able to dial in and get laser focus on those key issues that are providing some stumbling blocks for our company. It could be anything from, like I said, product development to vendor development, which is a big key, and to stay fresh and on top of costing." For participant 3 breaking down silos through their new management system is key for ensuring company success.

- Participant 4, Finance Manager, shared that their strategy is around the implementation of a new management system to align functions. The "new EOS management system position us to be more organized so now we know people's job duties better. We have a bigger team in every area so we are able to have enough resources to expand and do the things we couldn't do, you know, five years ago or ten years ago because we didn't

have the resources, so I think that's huge, and as we go on to other markets and as we approach things." For him, the alignment of resources through the use of their new management system is key.

4.5.2 Flexibility

Customers' needs and government regulations were the two main areas the four participants addressed during the discussion on flexibility. The use of Lean Manufacturing was mentioned throughout the interviews as being their way to continuously improve their process and become flexible. Product development was one of the key aspects the team felt was important to stay competitive in the market place.

Below are some quotes from participants regarding their approach to creating flexibility.

- Participant 1, Company President, shared the importance of flexibility from a regulation standpoint, addressing issues related to working hours of salary employees, environmental regulations about air contamination of the area they operate, how they use lean manufacturing to address ergonomics aspects and taking care of product safety, as some of their products have strict regulations related to drinking water. He expressed that from environmental stand point: "We are continuously, we have a paint booth, continuously updating, making enhancements in that area so that we can still legally paint." He stated that the use of Lean Manufacturing techniques is important in the way they become flexible. "We are also evolving with ergonomics, in our Lean approach, in improvements throughout the company in manufacturing, and I feel like that not only helps the employee, it also helps protect the company."

- Participant 2, Vice President Operations, provided his perspective of flexibility from a customer standpoint, and shared how they meet regularly to adjust their plans based on feedback they receive and by monitoring data.

"We meet weekly for about an hour and a half. We meet quarterly for an eight-hour period, off site, and we meet yearly for two whole days, off site. And during that time, we adjust, we handle issues, and we adjust what we call our view, or our business plan. So, we constantly monitor data coming into the company from a variety of sources and make adjustments as we need to do." He believed that adjusting to customer need was essential for their success.

- Participant 3, General Manager, mentioned how few years ago they were falling behind the competition and recently they have re-focus on product development. He provided the following perspective about flexibility: "It comes down to allowing creativity of our engineering group. Our company was built on that very thing, flexibility, and not building just a simple product. We were always, in the beginning, very accommodating to kind of changing specifics on some of our products that would allow us to get into certain markets." He mentioned that staying complacent was not an option their company could live with. "To stay progressive in the thinking and not to rest on our laurels with the past, especially with such an older company." From his point of view, making products tailored to customer need was one of the elements that provided success in the past.

- Participant 4, Finance Manager, shared the importance of flexibility through staying in touch with customers and ensuring they react to their need. "We have a lot of outlets to our customers, you know, with the distributors, going to the trade shows, so a lot of those allow us to figure out what's needed in the market place, what the customers are looking for, and I think that's why we have gotten from not having the data, by just, we have our ears open and we can react to what the customer wants." He was concerned that as they grow and become more complex, it might hinder their ability to react as fast they need to support customers.

4.5.3 Cost Management

All participants expressed the importance to control cost as a small company, including budget control, material cost reduction, and being able to better manage costs related to product development.

Below are some quotes from participants regarding their approach to manage cost and their cost reduction focus areas.

- Participant 1, Company President, shared how the company is managing cost, including watching closely their budget, material cost reduction, although being limited by their rigid vendor list, and using the power of Lean ideas from the personnel. "We have a company budget, right? And as a whole and it's broken down into departmental budgets that we meet up every month and go over the budget. We, our purchasing department is very active on keeping our cost down, but their hands are kind of tied because, I just mentioned our vendor approval list is kind of rigid, so they are not, they can't really shop around as much as we'd like. We also have a weekly Lean meeting or continuous improvement Lean meeting, and this helps cut our costs. Within this meeting, each department has to show up to the meeting with an improvement in mind, and then they commit to that improvement during the meeting in front of everyone." The organization is using the power of Lean Manufacturing techniques and the employee ideas to generate cost reduction.

- Participant 2, Vice President Operations, mentioned that his focus when managing cost is through their budget process. "So, we do have budgets we manage. And so, we have monthly budget meetings. We have a yearly budget. We also have a forecasted budget that allows us to make modifications along the way, so we can see where we are going because ultimately things happen, opportunities." He also expressed that they try

not to be too rigid with the budget, so they can capitalize on opportunities. “So we try not to be rigid in our budgeting process. In fact, we are not rigid in our budgeting process. We are very cognizant of it and we keep an eye on things and that’s how we manage it.” He was concerned that excessive cost control could truncate their ability to capitalize on business opportunities.

- Participant 3, General Manager, mentioned that managing cost is a collective effort, including looking at opportunities for investment in new product, when it is feasible. He mentioned: “That’s a collective effort, from the visionary, when he wants to drive home a new product, and then engineering to say yes or no, it’s not possible, it’s possible, but not cost effective, and then sales and marketing, you know, is there a demand for it? And then from a component standpoint, is it realistic to build it for x amount and to maintain a level of profit that we are looking for? So, it’s kind of a collective effort.” He shared similar perspective as participant 2 where managing cost should not get in the way of looking into business opportunities, including the investment of creating new products to meet customers need.

- Participant 4, Finance Manager, provided his perspective of how they manage cost through the analysis of material cost and also labor cost of making the product. The company have move into more systematic approach of using ERP software to track their cost and to update inflation. “We have bill of materials, and we are analyzing that. We actually set up somebody as a business analyst. We have ERP system now, IQMS. That’s helping, and through purchase in our P.O. system, we manage when cost goes up through there. We have date costs in the system, so we can see inflation from one year to the next, and also with labor we can update standard labor cost once a year.” His point of view on managing cost was

link to their ability to use a new enterprise system, that provides better visibility and more specificity on cost elements.

4.5.4 Knowledge

During the interview, I learned that the leadership team cares about knowledge and that learning is mainly enabled through the assignment of book reading and on-the-job training. They try to enable a culture of learning, using many ways to stimulate the organization to learn. Also, the president has been a significant contributor to the knowledge creation, capturing, and dissemination process by encouraging the use of Lean Manufacturing techniques, approving of external and internal training, and implementing a companywide ERP system to provide information across the enterprise. This was confirmed by the other participants during the interview process.

Below are some quotes from participants regarding their approach to knowledge creation and dissemination.

- Participant 1, Company President, mentioned that he is a believer of learning and it was evident that he supports others to learn as well: “I’m always learning. Personally, I like to learn different ways, even if that means consuming a couple business books a month. I will even go to solid works training with our team. I love working with solid works. I like it in the trenches with people, so that’s the way.” However, he emphasized how it is more important for him to hire people because of their values and attitude, rather than their skill level, as the latter can be learned. “It’s their hunger, their drive, their ambition. Because I believe that skill can be learned, but your values are within us.” He also expressed the importance of hiring people that will bring the right level of education, but will screen for people that can work with others, as it is important they can work and learn from each other.

- Participant 2, Vice President Operations, mentioned that they learn in different ways, including reading books, bringing consultants for training or sending personnel for training, such as Solid Works for engineers and CMM software for quality department personnel. He expressed: “We do ask the teams to read a number of books as we go along. So, there’s continuous education going on there. We bring in consultants periodically to give training to our mid-level management, as well to upper level management.” He also provided the perspective of learning together when they meet and discuss business progress. They use a way to rate meetings, to ensure the meetings are effective and they learn throughout the process.

- Participant 3, General Manager, emphasized the importance of developing others. “There’s just a tremendous forward movement for developing our people for, we call it for our bench, making sure that not one particular person in a function has all the knowledge.” He thought that the organization do invest significantly on knowledge. “So, it’s all about education, teaching, mentoring, we do a ton of that here.” He also expressed that in the future they needed to invest in more formal education. “I think going forward here we are looking to build our company based on a more formal education, though. We recently hired five engineers in the last year and a half.”

- Participant 4, Finance Manager, expressed how they use meetings to share information and learn. He also shared how they go about evaluating the meetings for effectiveness. “We rate the meetings: are they effective? Do we have issues? We solve the issues, we identify them, so we basically, with our score card, we call it, it’s a bunch of metrics and we will go ahead and say, are we meeting our deadlines on the checklist.” Also, he mentioned that the leadership and other employees read books as a way of learning. They might assign books to the leadership and other employees to help in the knowledge creation process. “So, we are actually always

reading books and learning, at least at the higher level, but even at the lower level, people are asked to read and learn. So yeah, we're continuously learning."

4.5.5 Innovation

Below are some quotes from participants regarding their approach to process and product innovation.

- Participant 1, Company President, mentioned that innovation is one of the most important aspects of their company. In his own words, he expressed: "Innovation is my number one. It's, I think it's, it's within our culture, it's being able to innovate." He also mentioned to be concerned about how as the company grow and they move into more sophisticated system and processes they lose ability to innovate. "At the same time, my concern is that we are squeezing out creativity and innovation, and suffocating it. So, now my focus is to get creative and figure out a way to harness that within each department and not let them think just because we have written in this rigid format we are not open to making some changes that are going to be for positive reasons." His focus is in engineering function, where he is planning to create a Research and Development engineering team to continue focusing in innovation: "I'm going to be starting up an R&D department, so it could be a little less rigid, less boundaries, a lot less boundaries, and where we can focus on science and research."

- Participant 2, Vice President Operations, shared how the company beginnings was based on innovation. He provided a recount how the founder of the company invented their own pump, to be able to provide solutions to their customers. "So, at the time, he had to purchase one of these pumps in 1957, and the cost was exorbitant. So, he had a problem that needed a solution, so instead of buying that pump, he just created his

own." Participant 2 described how resolving this constraint and get it approved by the City of Los Angeles (customer) helped the company to succeed. Being able to listen and innovate is key to meet their customer needs. "To me, that's innovation. Finding a situation in your customer's world that needs a solution. They have a ton of them if you listen, and they tell you all the time because they give you all their problems."

- Participant 3, General Manager, mentioned how innovation is one of their seven core values and is the responsibility of everyone, not just engineering. "Innovation is one of our core values of the company, and we have seven of them. In order to work here, you have to believe, you have to really believe and live the seven core values, which are passionate, innovative, teamwork, helpful, integrity, reliable, and respectful. Being innovative isn't just for engineers. It is for every level in our company." He shared how through the use of Lean process training, they have improved the skills of their personnel, including being innovative: "We started from the bottom and started creating these innovative-thinking people." This shows how their focus in innovation is critical to their success.

- Participant 4, Finance Manager, shared his point of view of what innovation is for the organization: "So basically, innovation is always happening on the shop floor. The production manager, you know, from a couple years ago, he has reduced inventory. They have, they are 94% on time rate. They are always looking for ways to improve something." He also mentioned how they go about engaging on innovation, especially process innovation. "They have level ten meeting, so every week, they meet and they will actually identify an issue. They will discuss it, and they will solve it. They are constantly doing that so they are questioning each other, they are trying to improve things, then with the Lean implementation, which was from the top down again, I mean, people are free to kind of innovate, to make things

better, make things quicker, make things easier." They use Lean Manufacturing tools to innovate their processes.

4.5.6 Communication

Below are some quotes from participants regarding internal and external communication.

- Participant 1, Company President, provided detail of how he communicates to the entire company in a quarterly basis and shares all numbers related to the business. He felt that is important the employees know how the company is performing. "I go over where we have been over the last quarter, where we are, and where we are going, give them all of our numbers, everything except what people get paid. I mean, I tell them all about the revenue, basically whatever you see up here." Also, he shared other themes he will cover during the meeting. For example, that month he was going to discuss innovation. "And it's interesting that we are having this meeting right now because my main focus on Wednesday is going to be about creativity, innovation. And how it's all within us and maybe get different levels, different scales, but I have heard when I walk around that some people can't see past the way they make things, and in my opinion, that's being kind creative and being able to tap into that and maybe we have lost that in life as we have gotten older, kids are very creative. Everybody's creative. I just think it's taken away out of us as we age and grow, and so I want to remind everybody that it's in there, it's within you. So, I do that state of the address and I am going to talk about 20 minutes about creativity and innovation." He promotes weekly meetings organized around a concept they call level 10 meetings: "We have level 10 meetings, and everybody in the whole company is in one, which is amazing, even assembly line people." Also, he mentioned how they use scorecard to share the company's performance to all employees. "However, in the tour, when I walk you around, I'm going to show you some scoreboards. This is just the

leadership scoreboard. I will show you some other scoreboard metrics where the employees have access to. Oh yes. You will see that. Everybody knows how the company is doing." It seems that the President cares about his employees' participation in innovation and being transparent on the company's performance. He sees value in communicating frequently with his employees.

- Participant 2, Vice President Operations, also shared how level 10 meetings are one of their main ways to communicate: "One of the greatest tools we have to communicate internally is our level 10 meetings, so we, it starts from the top down, so we have this leadership group, and we meet, like I said, every Friday and the last thing that happens in that meeting is we ask, Is there anything that needs to be cascaded messages? So, I mean, this is a very formal agenda we go through during this meeting, very formal. I mean within minutes. You get five minutes for this, five minutes for this, five minutes for this, ten minutes for this, forty-five minutes for this, ten, so the last part is communicating messages out." One of the key aspects of this meeting is that they will decide what needs to be communicated to the rest of the employees that have a need to know. Participant 2 did express concern of what is communicated in some meetings, because some of the information about product development can be sensitive, if the competition learns about it. "We want everyone to understand what the path is, but I don't know if everyone needs to see all the numbers on here. Dollars, because we don't want that information getting out to our competitors. Also, I'm concerned about the competitors knowing about what products we are developing or what issues we are dealing with. So, it's a struggle right now."

- Participant 3, General Manager, also shared about how every Friday the management team has a level 10 meeting to address company communication. "Again, going back to our management system, there is a management team that meets every Friday, and it's part of our system

about over communicating. We have what we call level 10 meetings, started out with our executive team. That meeting is the same time, same day, same length, it has to start on time, has to end on time, there is a specific agenda that we go through." Also, he shared the use of scorecard as a way to communicate the company performance to all employees: "You can look at what we call a scorecard, and on that scorecard are measurables that can be anything from cash flow to overtime dollars, the backlog, simple things." It seems as weekly meeting and the use of scorecards are the main vehicles to communicate in the company.

- Participant 4, Finance Manager, shared how they use different mechanism to communicate, including emails, instant messaging, phone, although less frequent, and face to face meetings. He provided details of how meeting is the most structure approach and his preferred way to communicate, but realize that it could slow down things. "We plan our meetings and we bring up issues only, but through the environment, we are free to talk to anybody, to solve something. Anybody can go out there, anybody can come up to the front office and communicate."

4.5.7 Supply Chain Integration Programs and Customization Practices

Below are some quotes from participants regarding supply chain integration and customization practices.

- Participant 1, Company President, provided his perspective about product customization and standard products. He expressed that customization has been key to get the company where they are, however, he believes that going forward the company need to focus on standard products and be selective of when to do customization. "The way we got here, is by a lot of customizing standard products. However, we need to change, and that's what we are focusing on right now, is we know what our customers want in

the industries we are focusing on and so we are designing the products to meet those demands within those markets. There's always going to be some customers that want a left-handed thread instead of a right hand or whatever. In the old days, we would provide them with that, even for smaller orders, and nowadays only if the quantity is there we will customize our products, but we are beginning to remove that from our current product offering, the idea of customizing our products, only because what got us here won't take us there." Participant 1 is trying to minimize complexity by limiting the many materials option they provided in their designs, and he believes the extra options they provide increase their operating cost. "It will meet the demand across the board and across the markets that we are in, so we said, we are not offering all of these different materials anymore, we are just this one. And we haven't had an issue with that. We haven't had any push back, and it is one of the most expensive materials to use, but I believe we have saved cost by eliminating those six other material options."

- Participant 2, Vice President Operations, share his perspective of how the combination of complex products are difficult for competition to copy and a distribution channel that is attracted to sell their products and provide service have allow them to create an entry barrier for competitors. "However, as we have built our distribution channels, as we have built our networks, as we have built our processes, I realized our real strength is our distribution network. Our real strength is our reps and especially depending on which markets, so the way to be more competitive and more innovative and the way to lock in that business is to create more complex products that the international companies could not provide the services and the support and the type of technical expertise needed to service and really sell that type of a product. So, by creating a more complicated product that solves local solutions, problems, it kind of put them, we created a barrier to them. But what it also did is it allowed our distribution network to really, by creating more expensive, more technical products, it allowed them to make a higher

margin, which they make, so now they want to work with us more." He also shared how their engagement on writing the specs and innovation will assure they have the right solution, that will be difficult for others to make or copy. "And like for instance, in certain markets there's specification-driven sales, so they get an exclusive, we drive the spec, we innovate our products so that the specifications are written in a certain way where we preclude as many of our competition as we can."

- Participant 3, General Manager, shared different aspects of lock-in mechanism. For example, from a supply standpoint they practice VMI with some suppliers to ensure material availability. "We do some VMI from a purchasing standpoint. It works out pretty well. It locks in availability so there's no stock-outs in certain parts, from a purchasing perspective. That works out really well. So, the responsibility for our procurement group is to make sure that they have done their legwork. I like that. That is something that takes the pressure off of long lead-time items that we run into with some of the part numbers, some custom items that aren't usually available." The VMI lock-in is a benefit to their supplier, however, it helps to make sure the company can reduce lead time to customers on custom products. "For us, we are building custom products with three to five days lead times. It's kind of challenging, but we practice all of that Lean processing, which helps a little bit. But what we do to lock-in, I think that we have such a history with so many of our customers they have now relied on these short lead-times." From participant 3 perspective, short lead-time of custom product is what differentiate them from competitors. "Our strength is that they know it's typically available in a short period of time. Short lead-time is our strength. That's what separates us from our competition. Some fairly sophisticated custom products in a short lead-time is absolutely our strength. That's what the company was built on."
- Participant 4, Finance Manager, mentioned how the company make products that customers can only get from them and helps establish a

partnership relationship. “Sometimes, you know, we make the only thing they can buy that has a solution. So that’s one of our battles. This Lean thing, the cutting inventory, trying to be, you know, make the margins better, well, sometimes there’s a cost to that. But it does what you are saying, locks in the customers by being the only one who can provide certain things they want.” His understanding is that being responsive and short lead-time helps to lock-in business. “We kind of respond a lot faster, from what we are hearing, than a lot of the competition. So, I think that’s it. Customizing things, listening to our customers, and basically doing things that larger companies can’t do because it’s not their business model.”

4.6 Reflection about the Cases

The semi-structured interviews and the site tours provided great access to learning about the four companies. What the companies had in common was that they were operating in the same region, were manufacturers of some type of device or product, and shared similar external challenges related to increasing operational cost due to government regulations and new minimum wages being imposed on them. However, each one of the companies had its own intrinsic culture, shaped by the industry they operate in and the knowledge that their Owner or President or leadership member had about the markets they serve. The products that they manufactured were geared to a specific customer base, with little relevance to consumers or the broader market. The culture in Cases 2, 3, and 4 was one of continuous improvement based on Lean Manufacturing principles. Though the Case 1 Company lacked the knowledge of how to implement such practices, they were eager to learn. Willingness to learn about best practices to improve their operation was a common attribute across all Cases.

All Cases were proud to show their products and how they developed them, including their approach to lock-in business with their customers. Also, they shared how their employees were key to their success and why it was important for them to invest in their knowledge acquisition and dissemination through continuous education and training to

help develop their skills. Among the interviewees in each company, I found sporadic tension about aspects that some functions (production, finance, engineering, etc.) thought was important to them, versus what was important to the organization in general, including the Owner or Leader's perspective. Participants shared concerns about some of the practices they had, including tight budget controls or needing to choose to investment in some areas and not in others. However, no major contradiction among participants in each company were found regarding what was important to all of them as an organization, including the need to remain competitive and to continue to hear and engage with their customers through collaboration on product design and development.

The seven factors explored during each Case will be discussed and analyzed in the next section and will provide a broader perspective of how these factors influenced SME business sustainability. Similarities and common themes will be shared in the next section through a Cross-Case Analysis. The learning and findings of the Cases helped to identify the actions that SMEs operating in high-cost regions can take to improve their ability to create a competitive advantage and to become sustainable. This includes some of the business sustainability essential practices observed throughout the Case Studies.

Chapter 5 - Discussion

The Discussion chapter starts with a short introduction of the seven key factors and a cross comparison matrix that provides a description of the common practices from each Case with respect to each factor. Following the introduction, there is a detailed description of how each of the key factors impact business sustainability. The chapter concludes with a section related to the three essential business sustainability practices observed during the Case Studies.

5.1 Introduction to the Discussion

The Cases revealed that SMEs in high-cost regions are being challenged in different ways to remain competitive and they are using diverse means to create business sustainability. Gunasekaran et al. (2011, pp. 5489-5490) propose that SMEs' resilience and competitiveness is influenced by operations strategies, technology, and globalization. The authors propose that SMEs have advantages over large companies because of their size and flexibility while adapting to change.

The key factors studied influenced the ability of these four companies to stay in business and the interviews reflected that SMEs do approach business sustainability in similar ways, including locking-in customers through product design or supply chain program engagement and driving productivity and cost reductions through continuous improvement approaches such as Lean Manufacturing while engaging in product and process innovation to support their customers' needs. Other areas such as diversification are being embraced by SMEs in order to grow their business and reduce risk due to recession or industry downturn, thereby reflecting resilience to such conditions.

In each Case, a site tour followed the four interviews, where I compared the discussion about how they remain competitive and create sustainability to their practices on the shop floor. The interview discussions, in general, aligned with what I saw on the shop floor. No apparent disconnects were noticed. For Case 1, the Owner and other personnel

interviewed recognized the need to improve organization on the shop floor and expressed their lack of knowledge of Lean Manufacturing practices. The other Cases were at different levels of Lean Manufacturing deployment; however, the efforts in this area were evident. My reflections about the tour and the interviews were captured after each visit, and a summary was generated that included where the participants had similarities, differences, and concerns.

The Cross-Cases Comparison matrix below (Table 8, pages 139-140) summarizes the companies' practices in relation to the seven factors. These practices were then contrasted across the four cases to identify similar and different approaches to business sustainability. The matrix shows a relationship between the seven key factors and the three essential sustainability practices observed during the Case Studies. From the similarities and differences listed in the last column of the Table 8, the following can be noticed:

- Continuous Improvement practices drove flexibility and cost reduction
- Lock-in practices were enabled through the use of process and product innovation and Supply Chain Integration and Customization
- Diversification practices were included in the SMEs' long-term strategy discussions

Communication and knowledge were factors that supported the three business sustainability practices. Section 5.2 (page 141) and 5.3 (page 145) will elaborate on the interrelationship between the seven factors and the three business sustainability practices.

Table 8 – Cross-Cases Comparison Matrix

	Cases				
Factors	**Case 1**	**Case 2**	**Case 3**	**Case 4**	**Comparison**
Strategy	No overarching business sustainability strategy; believe that diversification is key to their success. Focused on creating innovative products to ensure technology leadership in the market place.	Strategy focus on penetrating new markets or industries and continuous improvement - From Oil and Gas to other industries - Use of Lean Manufacturing practices	Strategy focus on penetrating new markets or industries and continuous improvement - Continue expanding medical devices customers through innovative products - Use of Lean Manufacturing practices	Strategy focus on Flexibility, Innovation and Customization of products and solutions - Use of Lean Manufacturing practices; ability to create additional work cells overnight - Manage complexity through new management system	**Similarities**: Striving to diversify, creating innovative products, and using lean manufacturing techniques as practices to business sustainability success. **Differences**: Approach to diversification varies, including exploring other markets, or other industries, or expanding into other regions.
Flexibility	Approach to flexibility is though modification or creation of new product designs to meet customers need.	Create flexibility through the use of lean manufacturing techniques; use of cell manufacturing and flow assembly lines, 5S and standardized work. Modify product offering to respond to customers' market need.	Create flexibility through the use of lean manufacturing techniques; use of cell manufacturing and flow assembly lines, 5S and standardized work.	Create flexibility through the use of lean manufacturing techniques; use of cell manufacturing and flow assembly lines, 5S and standardized work. Modify product offering to respond to customers' market need.	**Similarities**: Use of lean manufacturing techniques to respond effectively to customers need by reducing product lead time shipment and augmenting product offerings in a shorter time. **Differences**: Approach to flexibility might be product or process oriented, or combination of both.
Cost Management	Participants agreed that cost reduction was important, however, no consistent approach was in place. - Material bidding process; although not done systematically - Controlling travel expenses	Focus to reduce cost include - Material bidding process; partnering with incumbent suppliers to reduce non-value add activities - Use of Lean Manufacturing practices to reduce waste in the shop floor	Focus to reduce cost - Material cost reduction through bidding process and reducing material scrap - Use of Lean Manufacturing practices for labor efficiency	Focus to reduce cost - Expressed the importance of having a budget, measuring and controlling their cost - Material cost reduction, as is the largest bucket to effect - Use of Lean Manufacturing practices	**Similarities**: Main focus on productivity improvement through use of lean manufacturing techniques and material savings via bidding process. **Differences**: Other cost reduction focus might not be as coordinated, including controlling expenses, such as travel, medical, insurance or other overhead expenses.
Knowledge	Focus mainly on the job training and sometimes providing external specialized and technical training.	Focus on - Providing cross training - Kaizen events - Offer the opportunity for employees to get external education including technical certifications company paid	Knowledge creation - Provide internal and external training - Offer external formal education for employees that wanted to progress their careers, company paid	It was evident that management made education and learning one of their top priority, including - Books reading assigned throughout the year - Offer specialized training to ensure employees are effective on their job	**Similarities**: On the job training and internal training, supplemented by external training, all company paid. **Differences**: Use of innovative learning via assigning books to employees was not used throughout all companies.

Factors	Case 1	Case 2	Case 3	Case 4	Comparison
Innovation	Participants agreed on the need for innovation, however, they felt that the economy had an impact on their engineering resources; main focus on product innovation.	Approach to innovation is mainly process oriented, although engage in innovative product designs to resolve field issues for customers.	Approach to innovation is process and product oriented, often having design ownership.	Practice innovation from both product and process improvement perspective.	**Similarities**: Innovation is both process and product focused, although more control over process innovation. The innovative product designs are intended to lock-in through customization. **Differences**: Approach to product innovation was internal driven (design ownership) vs customer / external driven (co-ownership); although it seemed that all designs were influenced by customers and markets need.
Communication	internal Communication is through meetings, including production meeting, engineering meeting and sales meeting. Often one-on-one communication with employees. External Communication is typically through e-mail, although phone calls are also used.	Internal Communication is through daily morning meeting and face to face approach. In a more formal way, they will communicate the business results during a monthly meeting. External Often they talk to customers face to face. They will use emails, phone calls, and website to communicate with customers.	Internal Preponderance of meetings for communicating internally. From informative to specific meetings about corrective actions to business review in a quarterly basis. Quarterly meetings are held with all employees to share status of the business. External Mainly carried through e-mail, and occasionally customers visit.	Internal Structure approach to communication among the leadership team and cascade down to all company employees. They communicate the company performance, using scorecards, and use scoreboards throughout the shop floor External Mainly carried through e-mail, and occasionally customers visit.	**Similarities**: Many venues for internal communication practiced, including formal and informal meetings and one-on-one discussion. External communication not as regular. Face to face meeting with customers practiced. **Differences**: Some companies practiced frequent face-to-face communication, while others depended more on e-mails communication.
Supply Chain Integrations Programs and Customization Practices	Main approaches to Supply Chain integration - Customization to help lock-in business with customers - Customer support and service - Offering preventative maintenance contracts	Main approaches to Supply Chain integration - Service, including the stocking of finished products to help shorten lead times - Customization to help lock-in business with their customer base	Main approaches to Supply Chain Integration - Customer participation in new product introduction process; co-designing and co-owning the design to lock-in customers - Contractual agreement	Main approaches to Supply Chain Integration - Customization with short lead time; enabled by having Vendor Management Inventory (VMI) programs with key suppliers.	**Similarities**: Lock-in approach practiced throughout; actively engaging in product customization. In addition, they practiced raw materials stocking approaches to enable shorter product lead time to Customers. **Differences**: Some exercise Customer Contracts as a way to formalize business lock-in for multi-year relationship, while others used an ad-hoc approach. VMI used in some instances to stock finished products to lock-in relationship with Customers and provide products in shorter lead-time.

5.2 Summary and reflection on business sustainability practices

The Case Study approach was centred on choosing various SMEs that were representative of small manufacturing businesses in a high-cost region and studying the approaches they follow to sustain their business in a global economy. The companies selected needed to be in business for at least 8 to 10 years to demonstrate their ability to remain in business despite the challenges of operating in a high-cost region.

When visiting each SME, I had an interview with four participants in each Company. The questions asked to each participant centred on the seven key factors and business sustainability practices learned during the literature review. The specific questions related to the seven key factors were:

- How does your business strategy address these challenges and tie to business sustainability?
- How do you create flexibility to address changing customer, market, and government demands?
- How do you manage cost?
- How do you create and measure knowledge in the organization? What is the level of education of your leadership team?
- What is innovation for you and how critical is it for your business? How do you determine the level of innovation needed for being successful in the market place?
- How do you communicate internally and externally? How do you measure the effectiveness of the communication?
- How do you integrate your process and products with your customers or suppliers? How effectively do you use lock-in mechanisms with customers (i.e.; VMI and Customization)?

While addressing these questions, the participants expressed their strength and areas of opportunity that enabled them to achieve business sustainability. In all cases, the researcher offered to help in any way they felt was needed to create business sustainability and to improve their productivity.

When visiting Company 1, during the discussion about how they manage cost (third question above), the Owner expressed his concern regarding their ability to invest more money in the company to support diversification because of their challenges with high material cost. This opened the opportunity to engage in Action Research, and I worked with his team to create a Supply Strategy using tools such as Supply Segmentation, Pareto Analysis, and a formal Request For Quotation (RFQ) process. A new process for formulating a sourcing strategy directed to cost savings, including the use of Supply Segmentation and a formal Request For Quotation (RFQ) process, was implemented in Company 1. The other Companies received feedback concerning their business and operations activities.

While interviewing the participants and then touring their facility, it was evident based on my experience in Lean Manufacturing and other continuous improvement roles that the SMEs were relying on Lean Manufacturing practices to ensure they remained cost effective, focused on customers' needs, reduced lead-times, and enabled flexibility. When touring the facilities, the person leading the tour was offered immediate feedback and ways to improve their shop floor. I shared aspects of 5S organization and continuous flow that could enhance their current efforts. I provided feedback as we walked through the Site. In most cases, the areas seemed to be well organized and clean. The first Case could use some help with Lean Manufacturing tools, including managing the replenishment and storing of supplies (Kanban pull) and re-layout of the assembly area (Continuous Flow). Also, when they shared their practices of lock-in and diversification, they realized and expressed that being competitive and financially viable was not enough to retain or gain more business, as there was greater risk to lose business to low-cost region competitors.

Company 1 provides products engineered for a niche market. However, when reflecting on the many companies and sites that I have visited to perform Lean Manufacturing audits, Company 1 operations' capabilities had significant opportunities for improvement from a layout organization and material and product flow perspective. During the interview discussion with the Owner related to cost management, he mentioned that this

was one of the areas he needed help. He felt that their products are differentiated; however, they did not have at that time a systematic approach to reduce cost, specifically material cost, which was the highest contributor to the Cost of Goods Sold. As it relates to Action Research, Company 1 Owner asked me for help related to Strategic Sourcing and Negotiation.

Coghlan and Brannick (2010, p. 3) provided four characteristics of an action research process, which includes "research in action, collaborative democratic partnership, research concurrent action, and a sequence of events and an approach to problem solving."

The following is an example of action research in Company 1:

- "research in action" - During the visit to Company 1, the Owner requested help to learn ways to systematically reduce their material cost and negotiate better terms with suppliers. The Owner shared various years' financial reports, which confirmed the thin margin under which they were operating. After generating various profitability ratios and reviewing various financial statements, it became evident that material cost was a significant driver to their Cost of Goods Sold. The Operations leader confirmed that material was their largest cost driver and that it was a challenge to get cost reduction from their suppliers due to their company size.
- "collaborative democratic partnership" – The Owner and I agreed to evaluate the current conditions and practices, as I saw this as a great learning opportunity in both directions. We also agreed that my engagement was for free and that the intervention was going to be used for the purpose of the thesis study work.
- "research concurrent action" - I met with the Owner a second time face-to-face to define the need and to scope the intervention, including agreeing to what data they needed to share for helping with the process. Data included current suppliers, material part numbers, description, current unit cost, annual quantity usage, and commodity or material classification.

- “a sequence of events and an approach to problem solving” - Various follow-up phone calls were made and data were shared. The researcher taught the Owner how to undertake a Supply Segmentation, create a formal Request For Quotation (RFQ), and negotiate better terms with the suppliers. A few months later, I followed up with the Owner, and he expressed how satisfied he was with the results of the RFQ and shared they have seen significant cost savings from the process. He also mentioned that he has trained someone in his organization to be able to do this process in a more frequent basis to sustain the gains. The Owner’s intention with implementing these practices is to make the company more business sustainable by reinvesting money into expanding their products and solutions offerings to diversify their customer portfolio and penetrate other markets.

Company 2 provides products that are mainly mechanical in nature. Their main concern is their customer and industry base concentration. Although they have focused significantly on improving productivity through Lean Manufacturing practices and have effective lock-in practices with their current customer base, from a strategy stand point, they need to continue emphasizing diversification into other industries and markets.

Company 3 provides electronics equipment. Although they practice Lean Manufacturing and were significantly vertical integrated (i.e.: assembled internally printed circuit boards and cable harness), their main focus in the last few years has been growing into the medical device industries, because it is less sensitive to competition, provided their products are qualified into their customers’ design. They estimated that after they win a customer, their design is lock-in for 8 to 10 years.

Company 4 provides electro-mechanical equipment. They practice effective Lean Manufacturing and were engaged in designing products for specific niche markets with high customer concentration. Although they were focused on driving productivity, their main strategy was to continue diversifying through expanding into other markets and regions. One of their key customers was the California state government, so their strategy was to reach other states with similar needs. Their diversifications were valid, as their

product could be replaced by more cost competitive alternatives through the RFQs process (Request for Quotation). Also, they seemed to be focused on continuing to design products that were differentiated, so price did not become the only driver during the RFQs.

5.3 Key factors impact on business sustainability

The following is a detailed analysis of the SMEs' experiences and practices they shared during the interview process and how they link to the seven key factors identified during the literature review.

5.3.1 Strategy

How does your business strategy address these challenges and tie to business sustainability?

Company 1 participants revealed that they do not have an overarching strategy and it became evident throughout the face-to-face discussion that they were not aligned on what key aspects to focus on for business sustainability. Ismail et al. (2011, p. 5473) proposed that SME owners and managers, although technically capable, lack strategic view and are typically reactive rather than proactive. The authors further point out that operational agility is by itself not enough for resilience and that a strategic perspective is needed for enabling growth. Strategy is one of the areas the Owner/President hoped to learn about through the engagement of the case study. Company 1 managers and owner struggled to set a comprehensive strategy for their business as proposed by Vargo and Seville (2011), although they proposed the need to diversify their product portfolio by including software as a way to secure business. Two participants from Company 1 agreed on the need to diversify, while the other two wanted to continue with their current product focus in the market they were already in; however, no actions that supported diversification were provided nor acknowledged by any of the four participants. It seems Company 1 needs to come together and formulate a strategy that will provide the company with the

best alternatives for business sustainability. This could include diversification, lock-in mechanisms, or continuous improvement practices.

Acquaah et al. (2011) argue that family and non-family firms differ in their ability to align manufacturing and competitive strategies because of their different capabilities and resources. They further propose that non-family businesses can become resilient through the use of manufacturing strategies by using bargaining power and strong relationships with suppliers to attain cost leadership. Companies 2, 3 and 4 focused on a strategy to create diversification and to remain competitive through the use of Lean Manufacturing techniques.

Companies 2 and 3 expressed their core growth strategy was to penetrate new markets or industries to become more diversified. Company 2 expressed that its main focus was to diversify its sales from the Utility and Oil & Gas industries that represent most of its sales. Company 3 wanted to continue its incursion into the medical device industry as a way to secure long-term business contracts. These contracts make it difficult for customers to qualify for alternate sources, providing a way to lock-in with these customers for eight to ten years. These two companies also engaged in continuous improvement through Lean Manufacturing as a way to remain competitive in the market place. This aligns with Company 4's perspective, where Lean Manufacturing has provided them with flexibility to meet customer demand. The participants of Company 4 proposed that flexibility, innovation, and customization of products and solutions were the key strategies they focused on to continue their growth. They also highlighted the importance of the implementation of a new management system to help them better manage complexity as they continue to grow.

No major disconnect was observed in Companies 2, 3, and 4 during the research process regarding their current strategy focus. Key common themes of their strategies were continuous improvement, diversification, lock-in, and flexibility. Although it was not clear that Company 1 had a formal strategy, it recognized the importance of diversification.

5.3.2 Flexibility

How do you create flexibility to address changing customer, market, and government demands?

All companies expressed the importance of recognizing and responding to the voice of customers and customizing products to meet their needs. Ismail et al. (2011) propose that agility and flexibility could lead SMEs to compete more effectively in the market place and to become closer with customers. This intimacy is a key aspect that affects the ability of SMEs to create resilience. This aligns with Burnard and Bhamra (2011) who proposed that operational flexibility and innovation enable resilience.

Company 1 participants shared that the organization is flexible when it comes to providing products to meet specific customers' applications. They modify current designs to meet new customers or current customers' new applications. Their focus is on providing engineering solutions. They understand the importance of diversification and being cost effective. However, it was evident that Lean Manufacturing practices were not embraced as they were in the other three Cases. Thomas (2006, p. 1) proposes that SMEs require developing "leaner, flexible, and more responsive manufacturing systems" to cope with the current manufacturing environment and states that SMEs need to embrace advanced manufacturing technologies to do so.

Company 2, Company 3, and Company 4 had similar approaches to flexibility. They expressed their main approach to flexibility is using Lean Manufacturing tools such as cell manufacturing and flow assembly lines, 5S, standardized work, and product or material stocking programs such as VMI to reduce lead time. This provided their company with the ability to respond to customer demands in a short period of time. This aligns with Rahab (2012) who emphasized the importance of SMEs having a market orientation, especially through such aspects as flexibility and fast response time.

5.3.3 Cost Management

How do you manage cost?

Company 1 agreed on the need to reduce and control cost as a key area of focus, although the participants did not agree on the specific approach to reduce cost. One participant was focused on reducing material cost through bidding process, although this was done on an ad hoc basis with no systematic approach to analyze and aggregate spend for better negotiation leverage. Another participant expressed that controlling travel expenses was her main focus, while a third participant thought that the company was spending too much valuable time micro-managing travel expenses. Company 2 main areas of focus was to reduce cost by working with suppliers through a bidding process or partnering with incumbent suppliers to reduce non-value-added activities that increase material cost. Another area they focused on was on reducing waste on the shop floor by using Lean Manufacturing practices. Key to their success was the engagement of manufacturing personnel in continuous improvement practices. Company 3 participants agreed on the importance of managing cost, although two of the participants, including the President, mentioned that they do not manage cost as well as they should. Areas they focus on are material cost reduction and labor efficiency gains. Another key aspect they mentioned is reducing material scrap. Company 4 participants highlighted the importance of having a budget and measuring and controlling costs. They also highlighted the importance of focusing on material cost, as it is the largest bucket they can affect. After doing a plant tour at all sites, it became evident through observation that Companies 2, 3, and 4 have embraced a continuous improvement culture to reduce cost through Lean Manufacturing practices, while this remains an area of opportunity for Company 1.

5.3.4 Knowledge

How do you create and measure knowledge in the organization? What is the level of education of your leadership team?

Burnard and Bhamra (2011, p. 5591) propose that organizational learning could be an area that is neglected, which limits a company's ability to adjust to changing and dynamic disruptions. However, all companies expressed that knowledge is created and disseminated through internal and external training, predominantly through on-the-job training. Company 1 focuses mainly on on-the-job training and occasionally provide external specialized and technical training to employees, such as installers of their products in the field and to sales personnel. Also, the Owner noted that they use the daily production meeting to share knowledge. Company 2 mentioned that cross training and kaizen events were ways to create and disseminate knowledge, in addition to their informal daily meetings. They also offer employees the opportunity to receive external education, including technical certifications paid by the company. Company 3 also provides internal and external training, including external formal education that is paid by the company for employees that want to progress in their careers. The President expressed that they work on upgrading personnel through training and provided many trainings for different initiatives, including Lean Manufacturing. For Company 4, it was evident that management made education and learning one of their top priorities. The participants expressed that books are assigned throughout the year for reading and employees are incentivized monetarily if they complete the assignment. Also, they provided specialized training in Solid Works, CAD, and other software to ensure employees are effective in their job.

Ciemleja and Lace (2011) concluded that it is impossible to apply the same performance assessment to all enterprises due to their uniqueness; however, they recognize management knowledge and enterprise management as important factors in the process of value creation, which could enable sustainability. It was evident that the Owner or President of the four companies had vast knowledge of the products and markets in which they participated, which resulted in being able to drive business relationships with experts in the industry they operated.

5.3.5 Innovation

What is innovation for you and how critical is it for your business? How do you determine the level of innovation needed for being successful in the market place?

Bos-Brouwers (2010, p. 420) focused on the importance of innovation processes of SMEs as a mean to sustainability. However, the author highlights some of the characteristics that impairs SMEs in the market place, such as lack of resources and difficulty in acquiring funding. Company 1 participants agreed on the need for both process and product innovation; however, they felt that the economy had an impact on their engineering resources, limiting their ability to invest more into innovation. They engaged in product innovation to help sell their value to customers. Also, they tried to use innovation to get into a non-core process such as developing software, and the initiative was unsuccessful and costly to the organization. Participants expressed the need to process innovation but did not know how.

Company 2 approach to innovation was mainly process oriented rather than product oriented. Company 2 provided an interesting example; they invited a customer to spend a few days in its manufacturing shop to create an innovative product to resolve a field issue the customer was encountering. Four participants felt that they do not undertake significant product innovation but rather that their approach to innovation is through process improvement and using tools to be efficient. Participants 2 and 3 mentioned the electronic board that they implemented to help track customer order status in the shop and provide visibility. Participants 3 and 4, who typically deal directly with customers, both cited occasions of customers saying that they are “problem solvers” and “innovative guys.” They shared examples of innovative ideas related to product modifications they proposed to their customers that were implemented.

Company 3 was focused on process and product innovation. Participants 1 and 4 were aligned in their perspective about innovation, which is their focus in continuous process improvement. Participants 2 and 4 agreed that their innovation approach is geared

toward meeting customer expectations and expressed the importance of creating innovative products for the medical device industry.

Rahman et al. (2015) propose that, due to intense competition driven by changes in technology and globalization, SMEs need to engage in innovation to enhance their competitiveness. The authors focus on the technology innovation of new products and processes, which they believe could drive market and cost advantages, resulting in a competitive advantage (Rahman et al., 2015, p. 538). This aligns with Company 4 innovation practices, which include both product and process improvement to drive customer satisfaction. They provided an exciting example about their founder who invented a pump to meet a main customer's need; this pump was part of an overall solution to their main customer. A local supplier had considerably increased its cost, and the owner saw the need to invent a solution that would allow their company to stay in business. All four participants spoke with passion about how innovation is their key element to success.

Companies 2 and 3 focused mainly on process innovation, although they also engaged in opportunistic product innovation as an extension of their customer's design engineering efforts. Company 1 main focus was product innovation, which was one of their value propositions to their customers. They expressed that process innovation was an area of opportunity, but they had limited knowledge of how to pursue it. Company 4 focused on both product and process innovation. All agreed that innovation was key to remaining in business due to competition, especially low-cost region competition.

5.3.6 Communication

How do you communicate internally and externally? How do you measure the effectiveness of the communication?

Rahab (2012, p. 106) concluded that participatory communication, where employees are engaged, helps to create a culture of market orientation and learning, which then creates

innovativeness. The author explains that the dominance of the owner or top management in the decision-making process makes delegation ineffective in SMEs. The author concludes that linking customer orientation, learning, and innovativeness could help SMEs create sustainability for their business. During the interviews, it was evident that all four companies recognized the value of information sharing and communication. The following are examples of internal and external communication the participants shared.

Company 1 participants agreed that most internal communication is through meetings, including production meeting, engineering meeting, and sales meeting. Also, they agreed that external communication is typically through e-mail, although phone calls are also used. Participants 1 and 3 also mentioned that they often communicate one-on-one with employees.

Company 2 participants agreed that one of the key ways they communicate internally is through their daily morning meeting or through a face-to-face approach, due to proximity. They will communicate the business results more formally during a monthly meeting. From an external stand point, Participants 1, 2, and 3 concurred that they typically talk to customers face to face. In addition, they use emails or phone calls for communicating with customers. Participants 2 and 3 mentioned that the website they recently created is another mechanism to communicate to customers. Borade et al. (2013) propose that collaborative supply chain management techniques have been widely adopted in recent years, including the sharing of information between supplier and customer through the use of information technology.

Company 3 participants shared that there seems to be a preponderance of meetings for communicating internally. These meetings range from informative meetings, to specific meetings about corrective actions, to business reviews on a quarterly basis. The participants mentioned that there are weekly, bi-weekly, monthly, and quarterly meetings for communicating different aspects of the business. Participants 1 and 4 mentioned that quarterly meetings are held with all employees to share the status of the business. They also perform a significant number of internal audits to assess their processes, and this

serves as one venue of communication in the organization. Participants 2 and 3 mentioned that they typically use e-mail for external communication. It seems that internal communication is frequently done through daily production meetings, as was the case in all four companies.

Company 4 has a structured approach to communication among the leadership team that cascades down to all company employees. They have structured their meetings in an approach they call Level 10 meetings. During this meeting, they communicate the company's performance using scorecards, and they use scoreboards throughout the shop floor to share and communicate the information. Every employee is required to participate in one of the Level 10 meetings. External communication is mainly done through e-mail, and they will visit customers when necessary.

Borade and Sweeney (2015, p. 4812) propose that a higher level of supply chain integration requires better information sharing and strategic coordination, making Supply Chain partners depend on each other to be successful in the market place. This could serve SMEs very well, as it makes it more difficult for their customers to replace them.

5.3.7 Supply Chain Integration Programs and Customization Practices

How do you integrate your process and products with your customers or suppliers? How effectively do you use lock-in mechanisms with customers (i.e.; VMI and Customization)?

During the interview process, it was evident that all four companies engaged in customization of products as a means to secure business with their customers. Priyanto et al. (2012) propose that the custom-made strategy could be a key factor to creating a competitive advantage and to survive the competition. This aligns with Bos-Brouwers (2010), who proposed customization is a strong way SMEs can improve their relationship with customers, and with Thomas (2006), who sees an increased need for customization nowadays.

Participants 1 and 3 from Company 1 agreed that customization is a practice they do, which helps lock-in business with customers. They also believe that customer support and service is a way to integrate their process with customer needs. Participant 1 (Owner) believes that preventative maintenance contracts are a growth opportunity for the company. This aligns with participant 3 thoughts about customer support being an opportunity to generate revenue. Bos-Brouwers (2010, p. 430) listed various positive factors that help SMEs in the market place, including the role of the manager in innovation practices, the flexibility that SMEs demonstrate that is typically superior than larger organizations, and the willingness of SMEs to engage in customization of products, which can serve as a way to lock-in the customer relationship. During the demonstration of their products' capability during the facility tour, it was evident that the owner of company 1 was instrumental to the design and implementation of product's solution for their customers.

Company 2 participants agreed that service, including stocking finished products to shorten customer lead-times, is a key aspect that helps sustain their customer base. Elsayed and Hamdy (2012) propose that it is important for SMEs to adopt integrated systems to increase speed and fluidity and thus synchronize demand and supply. They translate integrated systems into three key themes including Lean logistics, agile logistics, and integration, which results in faster deliveries, reduced inventories and handling, lower costs, increased flexibility and responsiveness, while integrating all into one chain (Elsayed and Hamdy, 2012, p. 147). Participants 2, 3, and 4 agreed that customization is one of the key aspects that helps lock-in business with their customer base.

Participants 2 and 4 from Company 3 highlighted how the design of their product is key to the integration with their customers. Both agree that they typically own a portion of the design, which can help lock-in with the customers or at least make it more difficult for customers to move away business. Participant 1 mentioned that they do contractual agreements, and participant 4 implicitly referred to a commitment between both parties and mentioned that there is a 3-step review approval process when agreeing to collaborate on a design. Participants 2 and 4 agreed that there is a formal process for

new product introduction where customers are integrated into the process. This relates to Demmer and Vickery's (2011, p. 5407) observation that the company they were studying was successful because of its "ability to differentiate itself from its competitors…making it an essential member of its customers product development teams."

Company 4 participants agreed that providing custom products in a short lead-time is what helps them lock-in with their customers. The complexity of their products and ability to deliver these in a short lead time makes it difficult for their competitors to take market share from them. Participants 3 and 4 highlighted the importance of short lead-time to compete with companies located in other countries, including LCR suppliers. Short lead-time is enabled by having Vendor Management Inventory (VMI) programs with key suppliers. Derrouiche et al. (2008, p. 426) propose that, due to intense competition, organizations should collaborate with supply chain partners, both upstream and downstream. This collaboration can help reduce cost, enhance revenue, increase flexibility, and reduce uncertainties in supply and demand. The authors propose that a way customers and suppliers can collaborate is through a Vendor Management Inventory (VMI) program.

5.4 SMEs key business sustainability practices

The Conceptual Model developed at the outset of the thesis and modified during the literature review evolved into one that includes the top three business sustainability practices that were learned during the four Case Studies. The seven key factors identified during the literature review helped inform the initial questions used by the researcher during the Case Study interviews. This new model includes the following premises SMEs should practice to remain or become sustainable.

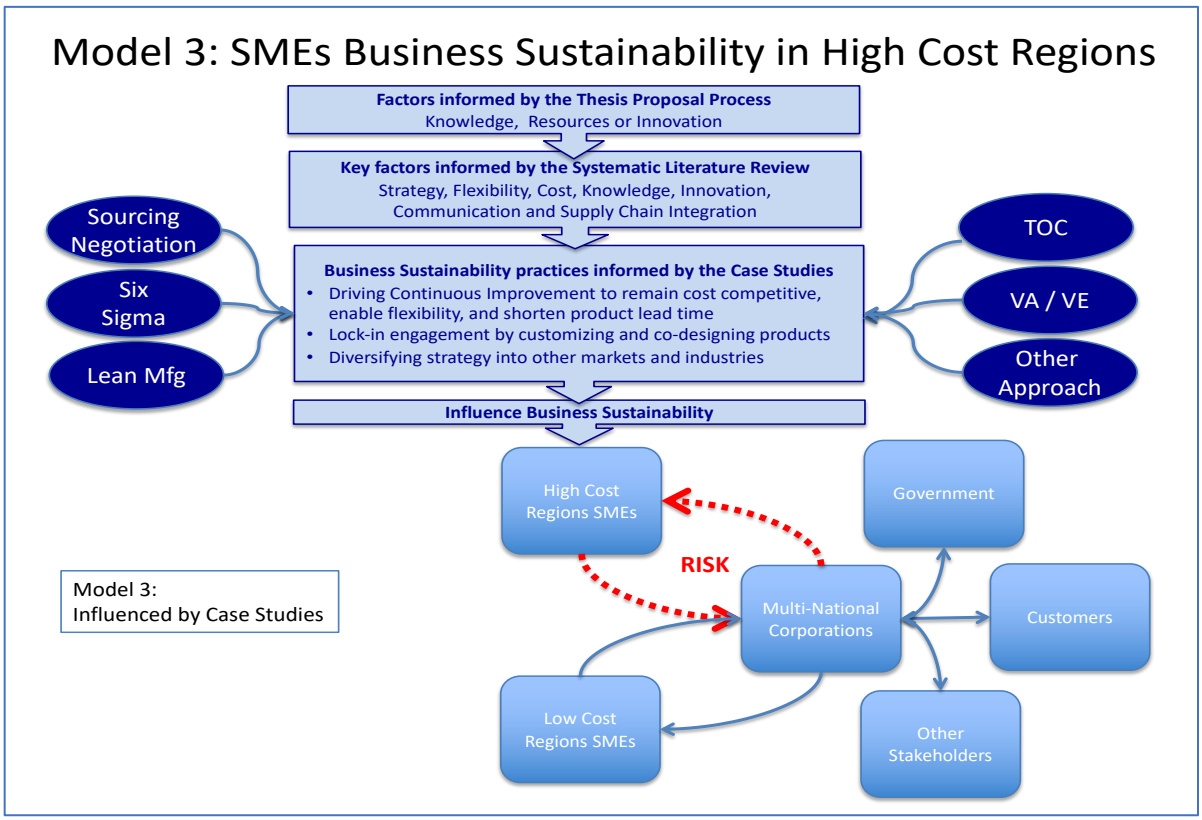
- Driving Continuous Improvement to remain cost competitive, enable flexibility, and shorten product lead-time. Examples of this practice are provided in section 5.4.1, page 157.

- Engaging in lock-in mechanisms by customizing and co-designing products. Examples of this practice are provided in section 5.4.2, page 159.
- Diversifying into other markets and industries. Examples of this practice are provided in section 5.4.3, page 161.

These three practices can create a competitive advantage over SMEs in Low-Cost Regions and are ingrained in the theory of Resource Based View as proposed by Madhani (2010). Resources and capabilities for Sustainable Competitive Advantages include tangible and intangible resources (Madhani, 2010, p. 9) as referred below:

- Tangible resources - Technological: SMEs visited possessed patents through co-designing products with their customers.
- Tangible resources - Physical: SMEs geographical location in the USA were close and accessible to their customer base, making it easier to collaborate in face-to-face design discussions.
- Intangible resources – Innovation: All four companies demonstrated Research and Development capabilities to innovate products to meet various requirements and complex designs, as well as customization to enable lock-in relationships.
- Intangible resources - Human: SMEs strived to have a flexible organization design and focused on a culture of continuous improvement to support customers' volume and variety requirements, as well as technical capable management to generate strategies and expand their product portfolio to diversify into other markets and industries.

Figure 7 – Factors and Practices influencing SMEs Business Sustainability (Model 3)



5.4.1 Driving Continuous Improvement to remain cost competitive, enable flexibility, and shorten product lead time

During the Case Studies, participants shared how important it was to practice continuous improvement to be competitive, to reinvest into the business, and to meet customers' lead-time requirements. Below are some of the participants' verbatim answers regarding continuous improvement practices being ingrained in their culture.

- Company 2, Participant 1 expressed: "In my opinion, one of our biggest assets or part of the strategy is continuous improvement. So, by making sure that there is no waste of either time or material and the continuous improvement activities on the floor, we will make sure that we keep our prices down and still have a profit."
- Company 2, Participant 2: "There are some core tenets that don't change. Continuous improvement is what the company is built on. It is the core. We focus

on continuously improving and that helps with a lot of challenges. It is the foundational element."

- Company 3, Participant 1: "Innovation is constantly thinking how, in my mind, of how things could be done better to improve upon, and that's just consistent with our philosophy as a company to continuous process improvement."
- Company 3, Participant 2: "He [President] implemented Lean and the 5S program, which, I worked with the President for 20 something years, so I know the benefits. I've been around with him for the benefits of those."
- Company 4, Participant 1: "We also have a weekly Lean meeting or Continuous Improvement Lean meeting, and this helps cut our costs."
- Company 4, Participant 4: "They are trying to improve things, then with the Lean implementation, which was from the top down again, I mean, people are free to kind of innovate, to make things better, make things quicker, make things easier."

It became evident from the interview discussions, the observations from the tours, and the financial data shared or discussed during the visits that those Cases that embraced a culture of continuous improvement, with active participation of all employees, were able to reduce cost due to productivity gains and felt that they were flexible in meeting customers' demand. Case 2, 3, and 4 showed to be performing better from a financial standpoint, while Case 1 recognized the need to reduce cost and reduce lead-time of their products. A culture of Continuous Improvement also helped the companies to systematically use the knowledge of their employees by integrating their ideas for process and product innovation. This seems to align with a study from Undertown and Liles (1998) based on nine case studies where the authors identified the need to formalize processes through the generation of a transformation plan, a process to develop their personnel, formal measurements, reward and control processes, and formal problem solving and continuous improvement processes enabled by teamwork to transform the organization.

SMEs in high-cost regions should use continuous improvement practices to remain competitive. Moreover, they should emphasize flexibility and reduce lead-times to retain business and gain a competitive edge over low-cost region suppliers, which tend to have

longer transportation and logistics lead-times due to their location relative to the customer base.

5.4.2 Engaging in lock-in mechanism by customizing and co-designing products

During the Case Studies, participants highlighted the importance of engaging with customers during the product design process to ensure they secured future business. They felt that this practice helps lock-in the relationship and supports business sustainability. Below are some of the participants' verbatim answers regarding how they lock-in with customers through product customization and product co-designing practices.

- Company 1, Participant 1: "Preventive maintenance contracts are a growing opportunity for this organization. We are dealing typically with research doctors and the nature of the business. They do not want to deal with variability of the equipment." The organization owns their design but customers are involved in the design stages, which might include customization.
- Company 1, Participant 3: "Well, some of the products that would be necessary for them (Customers) to maintain their equipment are supplies that we provide to them, and they might have difficulty outsourcing those or knowing how to outsource those from other places because they are so specific, and there are so many components to the systems."
- Company 2, Participant 3: "Hey, you guys are the guys, the problem solvers. You are the innovators of this industry. You are the only one with new products."
- Company 2, Participant 4: "Those are the go-to guys if you really, if you've got a problem, go to them. They will develop a tool, or they will develop a process, so they will come up with something creative to help."
- Company 3, Participant 2: "We do have an NPI process. A new product introduction process that works very good with customers from the get-go."
- Company 3, Participant 4: "So, we design to meet the customer's spec. They're involved in the approval. Our customers dictate much of our innovation. By their specifications, they tell us what we have to meet. So, we try to only meet the requirements of their specific custom product."

- Company 4, Participant 2: “And like, for instance, in certain markets there’s specification-driven sales, so they get an exclusive, we drive the spec, we innovate our products so that the specifications are written in a certain way where we preclude as many of our competition as we can.”
- Company 4, Participant 3: “For us, we are building custom products with three to five days lead-times. It’s kind of challenging, but we practice all of that Lean processing, which helps a little bit. But what we do to lock-in, I think that we have such a history with so many of our customers. They have now relied on these short lead-times.”

All the SMEs highlighted the importance of process and product innovation to be able to compete with LCR suppliers. Their approach was to engage in close discussion with their customers in the development of new products or modifications of the current ones. In almost all instances discussed, the SMEs strived to have some ownership in the designs as they collaborated with their customers to generate the drawings and specifications of the product design. They were interested in tying customers to the relationship through collaboration, rather than through legal means, and by being an extended arm of their customers’ design engineering team. When they launched a new product, they knew that they had locked into the business, as it was too expensive for their customers to generate a new design. Also, their willingness to customize the products and be flexible by adding different versions was ideal for their customers and resulted in repeated orders. This aligns with the study undertaken by Lipparini and Sobrero (1994) of 240 Italian manufacturing SMEs that found that the SMEs considered to be innovative and competitive were those that effectively used suppliers and customers in product design ideas and engaged with them on advanced production technologies.

SMEs in high-cost regions should ensure that their engineering resources work closely with their customer base to become a necessary force in the development and launching of new products, or have the agility to modify existing products. This engagement will enable lock-in to the customer product design and will become the driving market intelligence for the next product launch.

5.4.3 Diversifying into other markets and industries

Diversification was another practice the participants identified as key to their business sustainability. Below are some of the participants' verbatim answers regarding how they are engaging in diversification into other markets or industries.

- Company 1, Participant 1: "We have taken some of the equipment that we have designed for that and put it into the other markets, one being the Fish and Wildlife Department for maintaining the endangered species because of the drought."
- Company 1, Participant 2: "We have tried to diversify but stay within our core capabilities within our manufacturing and not go too far outside of that, where you don't have the resources either financially or technically to do certain things."
- Company 2, Participant 4: "Get some more customers in, diversity. Our goal at the end of our 5 year plan is to be half utility, half non-utility, half OEM so we are a little more diversified."
- Company 3, Participant 1: "We are identifying the markets and the customers in those markets that we want to go after, so we target those customers. There are certain conferences or trade-shows that we will participate in to try to cast a net to meet some of those people."
- Company 3, Participant 4: "We have specifically gone after medical because once you get designed in, you are going to have them for a 7-10 years life. You are not going to change the product frequently. They will keep their design for a longer period of time."
- Company 4, Participant 1: "We know what our customers want in the industries we are focusing on, and so we are designing the products to meet those demands within those markets."

SMEs mentioned during our discussion that avoiding dependency in their current customer base is a factor that is essential to their survival. They were concerned that LCR competition would steer customers to try other options. Also, all of them were striving to grow, so they realized they needed to introduce more products with current

customers and, at the same time, reach out to new customers in other markets and industries to diversify their portfolio. SMEs shared examples during the visit about their incursion into other industries, such as the medical device sector, which has a long product life cycle. SMEs experienced customers' purchase orders in this industry sector for 7 to 10 years for their products offering, as it is difficult for customers to move to someone else.

SMEs' Company Owners and Presidents should conduct adjacency strategy sessions with their teams to understand what other markets they should explore for diversification. This approach should be done routinely, rather than in an adhoc way, which seems to be the way SMEs approach it today. Phelps et al. (2007, p.9) point out that SMEs' strategic orientation needs to move from one that is opportunistic to one that is thoughtful and deliberated. It is recommended that SMEs include what Lewis and McKone (2016, p. 13) named Edge Strategy, which attempts to create a strategy based on competencies (inward out) instead of the typical strategies that are based on someone else's need (outward in). This helps SMEs go after what they are good at, elevating and better utilizing their current capabilities, rather than getting distracted on things outside of their core competency.

Chapter 6 - Conclusions

The Conclusion chapter opens with an introduction on the effect globalization has on SMEs operating in high-cost regions, the researcher's interest in the subject of sustainability, and approaches SMEs choose for sustainability. The chapter goes on to answer the three research questions that were the basis of this study:

- How do SMEs in high-cost regions approach business sustainability?
- How does management knowledge, resources, and innovation impact the sustainability of SMEs in high cost regions?
- Why do managers in SMEs in high cost regions choose specific business sustainability approaches?

Finally, the Chapter recaps with recommendations, reflections, and limitations of the research.

Globalization has provided opportunities for many large and small companies, while increasing competition for SMEs located in high-cost regions. Large multi-national companies (MNC) strive to remain competitive and to increase their earnings per share (EPS), requiring professionals in the Supply Chain arena to look for alternatives to continue reducing material cost. This includes efforts to source from low-cost regions and to support sales expansion into these growth regions. Ibrahima et al. (2016, p. 394) proposed that globalization has forced SMEs to "look beyond local markets." MNC manufacturing sites relocate to better serve customers in developing regions, which provide SMEs in high-cost regions with additional challenges to sustain business. This not only includes the increased cost of logistics to serve those customers that move away into those growth regions but also includes the increased competition created by SMEs located in low-cost regions.

The research was conducted in California, a high-cost region, which presents challenges to companies including added regulations and increased minimum wage pay, compared to other regions in the world. However, this region also offers the benefit of close access

to institutions that can provide technological research and knowledge. These factors can influence the results of the study and might limit the transferability of the learning to only regions that are similar to California. From the articles researched, regions that could be comparable are countries like Switzerland, Germany, France, Italy, the UK, and Japan, among others, where environmental regulations, the cost of living, and the cost of operating a company are comparable. This aligns with my experience of interacting with SMEs in those countries that supply products to current and previous companies I worked for.

This dynamic contributed to my interest of the study subject "Business Sustainability for SMEs operating in high-cost regions" and the generation of the two main objectives for the research:

- Study how small and medium-sized enterprises (SME) select business sustainability approaches that successfully make it difficult for Multi-Nationals Corporations (MNC) to transfer work from them.

- Learn why SMEs select specific approaches over other approaches and how this impacts their ability to be financially sustainable.

The four SMEs that participated in this research were located in California, a high-cost region compared to other regions such as Mexico, China, or Eastern Europe, places where some of my current and previous employers have elected to operate due to labor cost and market access. All of the companies visited expressed concerned about low-cost regions' competition, increasing government regulations, and the ever-changing customer requirements. Seven key factors were selected during the literature review and studied during the research: strategy, supply chain integration, innovation, knowledge, flexibility, communication, and cost reduction. These factors were selected due to the frequency with which they appeared in the literature review articles and were considered important factors that could have an impact on SMEs' business sustainability.

6.1 Answers to the three research questions

The objective of the research, together with the seven factors, helped to scope the areas to be studied during the research. The following three guiding research questions were explored during the four case studies and a recount of the learning and findings are presented next.

1. How do SMEs in high-cost regions approach business sustainability?

During the visit and interview process, it was evident that some of the companies were more advanced in the use of continuous improvement approaches such as Lean Manufacturing techniques or a systematic use of Supply Chain practices to reduce material cost and inventory. Participants expressed that these approaches, together with their ability to engage in lock-in mechanisms with customers, were the main reasons for their business sustainability. Lock-in approaches ranged from being flexible in providing products in a very short lead-time to collaborating on product designs' customization. Innovation of products and processes helped SMEs collaborate actively in the design of future products, helping lock-in the business for years to come. Engaging in early design discussions with customers provided the SMEs with an edge over competitors and, in some instances, SMEs ensured design co-ownership before starting to supply products. Providing products in a short lead-time helped to distance themselves from suppliers overseas, due to the added transportation time. SMEs' willingness to customize products and their long-term contracts were evidence of customers' lock-in, and this resulted in a cycle of continued engagement on new product development.

The most recent literature review shows that key factors supporting SMEs' sustainability include using Lean practices to reduce cost and create flexibility (Lopez, 2017; De et al., 2017), innovating products and processes (Jordão et al., 2017; Witjes et al., 2017; Jones and Corral, 2017; De et al., 2017; Scoutto et al., 2018; Trianni et al., 2019), and collaborating with customers to develop products (Lopez, 2017; Schwab et al., 2019; Scoutto et al., 2018; Kot, 2018).

2. How does management knowledge, resources or innovation impact the sustainability of SMEs in high-cost regions?

DiPasquale and McInerney (2010, p. 341) stress the importance that knowledge management can have on SMEs and how they differ from large organizations. The authors point out that SMEs are challenged due to “scarce resources, volatility, and market influence”; however, they also recognize their “adaptability, valuing of human-based processes, and short communication lines.”

Recent articles in the last few years highlighted how knowledge (Jordão et al., 2017; Witjes et al., 2017; Jones and Corral, 2017; Scoutto et al., 2018), innovation of both products and processes (Jordão et al., 2017; Witjes et al., 2017; Jones and Corral, 2017; De et al., 2017; Scoutto et al., 2018; Trianni et al., 2019), and information sharing (Scoutto et al., 2018; Kot, 2018) with stakeholders are among the key factors that help SMEs’ sustainability. The lack of resources was identified as a negative factor, as it limited SMEs’ ability to engage in sustainability actions across social, environmental, and economic aspects (De et al., 2017; Trianni et al., 2019). However, Jones and Corral (2017, p. 265) proposed that SMEs could use external resources to complement SMEs’ knowledge of resources, including the use of academic resources. This aligns with Bos-Brouwers (2010) who proposed that SMEs could use universities and research institutions resources to address their knowledge deficiency and generate sustainability innovation.

In all instances, the Owner or President, which was the highest hierarchical figure, was engaged and leading the knowledge creation, spreading it to the organization, and connecting directly with customers’ representatives. They showed to be not only proficient in the products they manufactured but also had a good understanding of market needs and customers’ applications. They focused on process and product innovation and the use of technology to improve their performance. They expressed the importance of engaging in customers’ product-related design, including owning or co-owning the

product designs, and supporting their customers' innovation efforts. During the visits, it became evident that the management were willing to invest in the resources' education, both internally and externally. The employees seemed to be engaged and involved during the value creation process and were kept up to date through daily production meetings and other communication venues. The management was actively involved in providing ways to increase knowledge related to work processes and continuous improvement techniques. One characteristic that SME Owners from Cases 1, 2, and 3 shared was their active engagement in professional Roundtables to expand their knowledge by learning ideas and best-practices from other SMEs. Witjes et al. (2017, p. 531) also noted that Roundtables is a practice SMEs used to gain knowledge.

3. Why do managers in SMEs in high-cost regions choose specific business sustainability approaches?

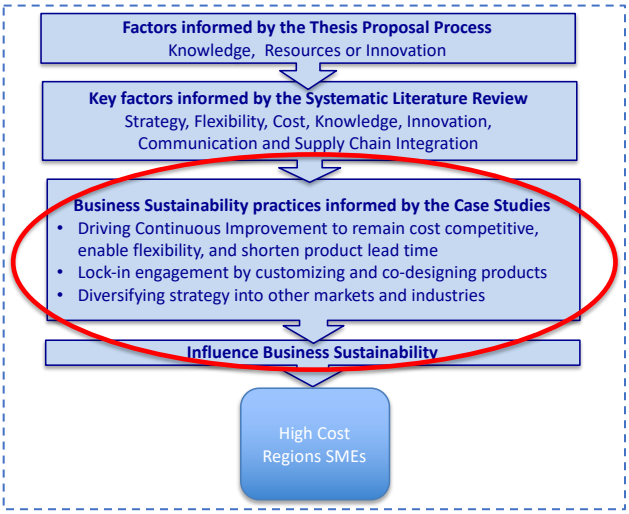
The choice of which sustainability approach the companies used was mainly attributed to their Owner or President's previous work experience. For companies 2, 3, and 4, where the use of Lean Manufacturing techniques was evident, the company leaders had experience in the use of this approach from other companies they worked for. They were the main proponents and champions of such an approach, as shared by the other participants. Lopez (2017) and De et al. (2017) proposed that Lean Manufacturing practices was a key factor for SMEs enabling flexibility and reducing cost, making them more sustainable. By contrast, Company 1 owner was not a practitioner of this approach, although had heard about the approach and wished he had been able to apply some of the tools such as 5S or pull systems to enable customer lead time improvement, reduce inventory levels, and reduce operational cost. A few months after the interviews and site visit tour, with the advice of the researcher, the Owner of Company 1 implemented a formal RFQ process that helped reduce material cost for his organization. He provided me with the feedback that this approach was effective and that he planned to use it again in the future. He shared his intent was to reinvesting the savings to expand their innovative product portfolio into other markets. This speaks to the need for creating a

knowledge-based learning source for SMEs to inform them of ways to enable business sustainability.

At the outset of the study, the researcher expected that the companies would speak about sustainable approaches such as Lean Manufacturing, Six Sigma, Theory Of Constraints, Value Analysis / Value Engineering, and Supply Chain, as these are common approaches used by MNCs in the researcher's experience. Lean Manufacturing and Supply Chain techniques were approaches used by SMEs to remain competitive. However, all companies stressed the importance of product customization as the way to lock-in customer business and were resolute about being part of their customers' design cycles. In addition, the four SME leaders expressed how important it was for them to continue diversifying into other markets and industries, as they were concerned about the risk of the current customer base concentration.

6.2 Recommendations, reflections, and limitations of the research

For the broader audience of SME Owners and Managers operating in high-cost regions, it is recommended to approach business sustainability from three distinctive but interrelated practices informed by the Case Studies, as shown below in the extract from the Conceptual Model, Figure 7 (page 157).



First, these Owners and Managers could implement a sound Continuous Improvement practice to better connect with their current customer base by being flexible to their customers' demands, reduce the product lead-time, reduce operational cost to be economically feasible, and help support reinvesting into the business to support growth. This presents a competitive advantage as referenced by Madhani (2010, p. 17), who noted, "In this current era of fast changing globalized world, if an organization is able to change swiftly and be more alert to changes in the competitive market, then they are more likely to gain and sustain competitive advantage." This practice proved to be effective, especially in Cases 2, 3, and 4, and was then adapted by Case 1 right after the visit by improving the way they systematically approached material cost reductions. The Owners / Presidents expressed that, with the cash generated by this practice, they were able to reinvest in the Company's new product development and drive other process improvements. Key factors that enable this practice are strategy, flexibility, cost management, knowledge, and innovation.

Second, to create lock-in, SMEs should practice by engaging in active product customization with their customer base, striving to own or co-own designs, and ensuring that dependency is created between the parties. The SMEs Owners / Presidents concurred that this practice was effective to ensure the generation of business revenue stream year after year and open the door to future programs, provided their performance was acceptable to their customers. Key factors that enable this practice are strategy, knowledge, innovation, communication, and supply chain-integration. Proximity to the customer base to co-develop product design is an advantage the four Companies have compared to LCR Suppliers.

Third, SMEs should diversify their products and service offerings across other customers' industries sectors, markets, or regions, to ensure they can balance risk across a larger customer base and enable growth. The SMEs Owners / Presidents expressed that this practice proved to be effective in situations where some of their customers' industries were in a down cycle while other customers were in the high cycle; diversifying helped

them balance their customer orders. Key factors that enable this practice are strategy, knowledge, and innovation.

Lean Manufacturing techniques, supply chain practices, and knowledge creation and dissemination helped the Case Study companies meet current customers' demands and the financial needs of the company. In addition, lock-in mechanisms such as product customization and design co-ownership, as well as market and industry diversification, surfaced as two key practices that enabled these companies to strive for long-term business sustainability. These approaches provided SMEs with a competitive advantage over SMEs in low-cost regions. This aligns with what Cantele et al. (2018, p.168) shared about Porter's opinion that competitive advantage is linked to value creation and hence to financial performance, and that this can be achieve through cost or differentiation strategies (Porter, 1985). This also align with Madhani's (2010, p. 16) proposal regarding a company's competitive advantage: "A firm's abilities also allow some firms to add value in customer value chain, develop new products or expand in new marketplace. When firm's capabilities are considered as paramount in the creation of competitive advantages, it will focus on reconfiguration of value chain activities."

The power of action research is demonstrated in the example of how I shared supply chain best practice with the Owner of Company 1, who in a short period of time embraced a new practice to generate a supply segmentation, created a RFQ, negotiated best prices for a key commodity, and experienced significant cost savings as a consequence of these actions. For SMEs to further increase their chances of creating business sustainability in the long term, SMEs should engage in active product innovation and customization and to strive to diversify their current product and market portfolio. The use of Value Analysis and Value Engineering can provide them with a good approach to engage in design discussion that could help them lock-in long-term business.

Actionable knowledge was evident in how SMEs put into practice what they learned about process improvement and product innovation to drive business sustainability and in how they took this learning and shared it with other SMEs. The learning coming from the

research has modified my personal practice as a Supply Chain practitioner of how to deal with SMEs in high cost regions. I now work closer with SMEs to understand their challenges and find a way of how we can work together to make them more competitive. Sharing the benefit of this relationship and best practices makes this a win-win situation. SMEs' approach to collaborate in product customization to ensure long term business and the active diversifying of their customer base seems to be effective in achieving sustainability. In addition, SMEs' practice of learning from other companies that are like theirs through Roundtables events is a good practice, as acknowledged by Witjes et al. (2017, p. 531). This should be a practice expanded across other organizations that can benefit of the experiences of others, provided they are not competitors in the market place, and perhaps these can be enriched by using academic resources. Furthermore, research of international literature by Jordão et al. (2017) recognized that SMEs "join action and cooperation" while striving to be "efficient and competitive" act as a network by "sharing information and knowledge" (Jordão et al. 2017, p. 670). This collaboration with SME companies can help elevate their knowledge and embrace sustainability approaches that help them succeed.

The thesis contributes to practitioners' knowledge, who lack access to resources that can help them with daily operational challenges; this thesis can help them create a comprehensive strategy for sustainability. Cantele et al. (2018, p. 174) propose that SMEs need to think strategically about how to approach sustainability to achieve a competitive advantage. Strategic themes of the four companies visited were continuous improvement, diversification, and lock-in through product design ownership or co-ownership. Their approach to engage in lock-in business with current customers and diversifying into other industries, markets, and regions, in a long-term strategic way has proven to be effective, as they have been operating for over one decade and continue to operate through the COVID-19 pandemic. The lock-in approach will enable long-term business sustainability and provide them with a greater linkage to their customer's supply chain.

Reflecting on my role in managerial and leadership positions with an influence in sourcing decision making, I look at my role from a different perspective now than I did prior to this research study. Before the research study, looking from the outside-in, I saw SMEs in high cost regions as an opportunity to reduce cost by moving the parts and products they supplied to low cost region suppliers. From that perspective, I saw the responsibility to be cost effective as one-way where the suppliers needed to offer savings if they wanted to retain the business. The thesis process helped change this perspective to a two-way approach after hearing their challenges and limitations of resources; having access to knowledge of sustainability approaches seems to be a win-win formula for both companies.

At my current role, I have been engaging more directly with SMEs in high cost regions, taking an inside-out role, attempting to understand what is inhibiting them from having a competitive advantage compared to LCR suppliers and offering advice of approaches they can follow. The approaches shared include Lean Manufacturing, waste reduction, supply chain sourcing techniques, Value Analysis and Value Engineering, and engaging more actively in the product design life cycle of their customers, including our company. This provides them with the opportunity to level the playing field and compete with SMEs in low-cost regions regarding Total Cost of Ownership; SMEs in high-cost regions gain a competitive advantage by better utilizing their resources and capitalizing on their proximity to customers.

For example, I have followed this approach with suppliers of Printed Circuit Board Assemblies from Ohio and Pennsylvania, Fabricated Machine parts from Pennsylvania and California, and Sheet Metal Fabrication parts from California and Ohio. This is action research in progress. In addition, over the past year, I have been leading my company's group in a strategy of reshoring material supplies currently purchased in China, providing SMEs in High-Cost Regions with the opportunity to gain additional business. The thesis findings influenced our strategy approach to reshoring from China to the USA and Europe. During an internal discussion with the Business Managers and Operations and Supply Chain leaders, we discussed the need to reduce lead-times, to become more flexible to

volume fluctuations, and to reduce risk of supplies to our customers. This drove the need to identify suppliers close to our manufacturing operations, including SMEs that operate in the USA and Western Europe which are able to support shorter lead-times, are willing to customize our product offerings, can collaborate in new product design processes, and are cost competitive. SMEs in high-cost regions such as the USA and Western Europe are well positioned to sustain and expand their business, provided they are cost competitive, flexible, able to support our new product introduction efforts, and able to customize our product offerings to meet market demands.

My recommendation to MNC Operations and Sourcing leaders is to take an insider view and position by engaging in more direct contact with SMEs operating in high cost regions to learn about their capabilities and limitations. They should invest time and resources to improve the relationship and help develop them into true partners by involving them in new designs and process improvement. For example, during the reshoring strategy from China to the USA and Western Europe, I am leading and educating the Operations and Supply Chain Leaders for the Company's Group to look beyond unit cost. This includes considering other key factors in the total cost of ownership, including logistics, transportation cost, and cost of inventory, as well as the impact of longer product lead time due to distance and mode of transportation from China. Also, SMEs in these HCRs are better positioned to participate in our product design processes due to proximity, technical expertise, and their willingness to customize products to support our customers' increasing demands.

For Scholar-Practitioners, this research points to opportunities to engage in internal or external consulting, as there is a need for knowledge of business sustainability approaches. There is a need for this knowledge to be deployed through practice rather than just theoretical teaching. This consulting opportunity should be directed to help SMEs learn lock-in mechanisms and other sustainability approaches that help them to cope with challenges and create competitive advantage to enable future growth. In addition, there is an opportunity to help SMEs craft a comprehensive strategy to diversify their business into other industries and markets to make them less susceptible to

business cycles and global issues, such as the pandemic, and to make them less dependent on a specific customer.

It is important to stress that although the cases were conducted in a high-cost region in the USA, it was limited to a small number of companies and a particular region, the State of California. It is recommended that other studies to explore whether the experience of the four Companies is observed in other high-cost regions, states, or countries, such as Western Europe, and confirm if the factors found to be associated with business sustainability are comprehensive. There could be different key factors in this region that impact SMEs compared to other high cost regions. Other States should be explored to understand how California regulations differ from other States and learn if these regulations have additional impacts on SMEs. In addition, other countries, especially those in Western Europe, should be explored, as there could be additional factors contributing to SME sustainability, such as subsidies or economic help, that provides them with a way to sustain their business in high-cost regions.

Appendix

Table A – Initial Articles Selected during Literature Review (4 pages)

Item	Title	Authors / Reference
1	Assessing Sustainability Support to Small and Medium Sized Enterprises (SMEs)	CONWAY, ELAINE. International Journal of Performability Engineering. Jun2014, Vol. 10 Issue 4, p377-386. 10p.
2	A Sustainability Indicator Framework for Singapore Small and Medium-Sized Manufacturing Enterprises	Tan, Hui Xian; Yeo, Zhiquan; Ng, Ruisheng; Tjandra, Tobias Bestari; Song, Bin. In The 22nd CIRP Conference on Life Cycle Engineering, Procedia CIRP. 2015 29:132-137 Language: English. DOI: 10.1016/j.procir.2015.01.028, Database: ScienceDirect
3	Designing and validating a model for measuring sustainability of overall innovation capability of small and medium-sized enterprises	Rahman, M.N.A.; Doroodian, M.; Muhamad, N.; Kamarulzaman, Y.. Sustainability (Switzerland), 2015, 7(1):537-562 Language: English. MDPI AG DOI: 10.3390/su7010537 , Database: Scopus®
4	Sustainable CSR for Micro, Small and Medium Enterprises	Tewari, Ruchi; Pathak, Taral. Journal of Management & Public Policy. Dec2014,
5	Sustainability Indicators for Small and Medium-sized Enterprises (SMEs) in the Transition to Provide Product-Service Systems (PSS)	Sundin, Erik; Näsländer, Elin; Lelah, Alan. In 7th Industrial Product-Service Systems Conference - PSS, industry transformation for sustainability and business, Procedia CIRP. 2015 30:149-154 Language: English. DOI: 10.1016/j.procir.2015.02.155, Database: ScienceDirect
6	Identification of Factors Influencing the Performance of Small Medium Enterprises (SMEs)	Anggadwita, Grisna; Mustafid, Qaanita Yuuha. In The 5th Indonesia International Conference on Innovation, Entrepreneurship, and Small Business (IICIES 2013)
7	ANALYSIS OF ROMANIAN SMALL AND MEDIUM ENTERPRISES' BANKRUPTCY RISK	Edina, Kulcsár. Annals of the University of Oradea, Economic Science Series. 2014, Vol. 23 Issue 1, p928-937. 10p. , Database: Business Source Complete
8	Responsible Innovation Toward Sustainable Development in Small and Medium-Sized Enterprises: a Resource Perspective	Halme, Minna; Korpela, Maria. Business Strategy & the Environment (John Wiley & Sons, Inc). Dec2014, Vol. 23 Issue 8, p547-566. 20p. DOI: 10.1002/bse.1801. , Database: Environment Complete
9	Resilience and competitiveness of small and medium size enterprises: an empirical research	Gunasekaran, Angappa; Rai, Bharatendra K.; Griffin, Michael. International Journal of Production Research. Sep2011, Vol. 49 Issue 18, p5489-5509. 21p. 2 Diagrams, 1 Chart, 3 Graphs. DOI: 10.1080/00207543.2011.563831. , Database: Business Source Complete
10	Strategy development in small and medium sized enterprises for sustainability and increased value creation	Moore, Samuel B.; Manring, Susan L.. In Journal of Cleaner Production. 2009 17(2):276-282 Language: English. DOI: 10.1016/j.jclepro.2008.06.004, Database: ScienceDirect
11	Sustainability and Small to Medium Sized Enterprises: How to Engage Them.	Condon, Linda. Australian Journal of Environmental Education, Vol. 20, No. 1, 2004: 57-67., Database: Informit Humanities & Social Sciences Collection
12	Globalisation sustainability of Malaysian small and medium-sized enterprises (SMEs) through gaining competitive advantages	Samad, Norliza Abd; Abdullah, Zalinawati; Jusoff, Kamaruzaman; Mohamad, Zaleha; Nair, Gopala Krishnan Sekharan; Interdisciplinary Journal of Contemporary Research in Business, Vol 2(1), May, 2010 pp. 399-413. Publisher: Institute of Interdisciplinary Business Research; [Journal Article], Database: PsycINFO
13	Sustainable Development Decision-Making Model for Small and Medium Enterprises	Mažų ir vidutiniųįmonių darnios plėtros sprendimų priėmimo modelis. By: Laurinkevičiūtė, Asta; Stasiškienė, Žaneta. Environmental Research, Engineering & Management. 2010, Vol. 52 Issue 2, p14-24. 11p. 1 Diagram, 8 Charts. , Database: Environment Complete
14	A Supply Chain Planning for Small and Medium Enterprises	Sitompul, Carles. In International Conference on Small and Medium Enterprises Development with a Theme ?Innovation and Sustainability in SME Development?
15	Innovativeness Model Of Small And Medium Enterprises Based On Market Orientation and Learning Orientation: Testing Moderating Effect Of Business Operation Mode	Rahab. In International Conference on Small and Medium Enterprises Development with a Theme ?Innovation and Sustainability in SME Development? (ICSMED 2012), Procedia Economics and Finance. 2012 4:97-109 Language: English. DOI: 10.1016/S2212-5671(12)00325-5, Database: ScienceDirect
16	What Impact Do Economic Issues Have on the Sustainability of Small, Medium and Micro Entrepreneurs?	Tshabalala, D. B.; Rankhumise, E. M. Journal of Management Policy & Practice. 2011, Vol. 12 Issue 1, p108-114. 7p. , Database: Business Source Complete
17	The sustainability of small businesses in recessionary times: Evidence from the strategies of urban and rural small businesses in New Zealand	Battisti, M.; Deakins, D.; Perry, M.. International Journal of Entrepreneurial Behaviour and Research, 2013, 19(1):72-96 Language: English. DOI: 10.1108/13552551311299260 , Database: Scopus®
18	A New Deal for Small and Medium Enterprises in India.	Kulkarni, P. R. ICFAI Journal of Entrepreneurship Development. Mar2008, Vol. 5 Issue 1, p23-34. 12p. 1 Chart, 1 Graph. , Database: Business Source Complete
19	Internationalization of Small and Medium-sized Enterprises (SMEs) and International Entrepreneurship: A Critique and Policy Implications.	Wright, Mike; Westhead, Paul; Ucbasaran, Deniz. Regional Studies. Oct2007, Vol. 41 Issue 7, p1013-1030. 18p. 1 Chart. DOI: 10.1080/00343400601120288. , Database: Business Source Complete
20	Financial sustainability in municipal solid waste management – Costs and revenues in Bahir Dar, Ethiopia.	Lohri, Christian Riuji; Camenzind, Ephraim Joseph; Zurbrügg, Christian. Waste Management. Feb2014, Vol. 34 Issue 2, p542-552. 11p. DOI: 10.1016/j.wasman.2013.10.014.

Item	Title	Authors / Reference
21	Brazilian design for sustainability: in search of a local approach	Romeiro Filho, Eduardo. In Journal of Cleaner Production. Nov 2013 Language: English. DOI: 10.1016/j.jclepro.2014.08.065, Database: ScienceDirect
22	The Impact of Small Firms' Characteristics on the Requirements of Integrated Logistics with Large Firms.	ElSayed Elkhouly, Sayed M.; Hamdy, Ola Mamdouh, Competition Forum 2012, Vol. 10 Issue 1, p147 (English Abstract Available), Database: SPORTDiscus with Full Text
23	Culture, Management Practices, and the Entrepreneurial Performance of Small and Medium Enterprises: Applications and Empirical Study in the Middle East	Chalhoub, Michel Soto; Journal of Small Business and Entrepreneurship, 2011, v. 24, iss. 1, pp. 67-84, Database: EconLit
24	Change process: a key enabler for building resilient SMEs.	Ates, Aylin; Bititci, Umit. International Journal of Production Research. Sep2011, Vol. 49 Issue 18, p5601-5618. 18p. 2 Diagrams, 1 Chart, 3 Graphs. DOI: 10.1080/00207543.2011.563825. , Database: Business Source Complete
25	THE SMES COMPETITIVENESS AUGMENTING, IN THE CONTEXT OF SUSTAINABILITY POLICIES AT EUROPEAN LEVEL, TROUGH IDENTIFICATION OF INNOVATIVE SOLUTIONS FOR THE MARKETING COMMUNICATION DEMARCHES.	Cecilia, Popescu Ioana; Diana, Vrânceanu; Cristi, Tatu. Annals of the University of Oradea, Economic Science Series. 2008, Vol. 17 Issue 4, p1114-1117. 4p. , Database: Business Source Complete
26	A roadmap for a methodology to assess, improve and sustain intra- and inter-enterprise system performance with respect to technology-product life cycle in small and medium manufacturers	Genaidy, A; Karwowski, W. HUMAN FACTORS AND ERGONOMICS IN MANUFACTURING; JAN-FEB, 2008; 18; 1; p70-p84, Database: Science Citation Index
27	Business sustainability: Empirical evidence on operational skills in SMEs in South Africa	Urban, B.; Naidoo, R.. Journal of Small Business and Enterprise Development, February 2012, 19(1):146-163 Language: English. DOI: 10.1108/14626001211196451 , Database: Scopus®
28	Does E-Commerce Provide a Sustained Competitive Advantage? An Investigation of Survival and Sustainability in Growth-Oriented Enterprises.	Qingyi Chen; Ning Zhang. Sustainability (2071-1050), 2015, Vol. 7 Issue 2, p1411-1428, 18p. Publisher: MDPI Publishing.
29	THE SUSTAINABILITY OF FAMILY BUSINESSES: EVIDENCE FROM THREE UK CASE STUDIES.	Dobson, John R.; Swift, Jonathan S. Journal of Business Management. 2008, Issue 1, p57-72. 16p. 2 Charts. , Database: Business Source Complete
30	Essential competences for small and medium family enterprises: A model for business success	Hernandez, FL. REVISTA DE CIENCIAS SOCIALES; MAY-AUG, 2007; 13; 2; p249-p263, Database: Social Sciences Citation Index
31	Managing Imbalanced Supply Chain Relationships for Sustainability: A Power Perspective.	Touboulic, Anne; Chicksand, Daniel; Walker, Helen. Decision Sciences. Aug2014, Vol. 45 Issue 4, p577-619. 43p. 3 Diagrams, 9 Charts. , Database: Business Source Complete
32	Engaging small- and medium-sized businesses in sustainability	Loucks, E.S.; Cho, C.H.; Martens, M.L.. Sustainability Accounting, Management and Policy Journal, October 2010, 1(2):178-200 Language: English. DOI: 10.1108/20408021011089239 , Database: Scopus®
33	Implementing corporate sustainability.	Windolph, Sarah Elena; Schaltegger, Stefan; Herzig, Christian. Sustainability Accounting, Management & Policy Journal, 2014, Vol. 5 Issue 4, p378-404, 27p. Publisher: Emerald Group Publishing Limited.
34	Fostering sustainability through sourcing from small businesses: public sector perspectives	Walker, Helen; Preuss, Lutz. In Sustainability and Supply Chain Management , Journal of Cleaner Production. 2008 16(15):1600-1609 Language: English. DOI: 10.1016/j.jclepro.2008.04.014, Database: ScienceDirect
35	Exploring the Problems and Advantages of Turkish SMEs for Sustainability	Günerergin, Mert; Penbek, Şebnem; Zaptçıoğlu, Deniz. In 8th International Strategic Management Conference, Procedia - Social and Behavioral Sciences. 12 October 2012 58:244-251 Language: English. DOI: 10.1016/j.sbspro.2012.09.998, Database: ScienceDirect
36	The Model of Sustainable Performance of Small and Medium-sized Enterprise.	Smulkiųjų ir vidutinių įmoniu darnios veiklos modelis. By: Ciemleja, Guna; Lace, Natalja. Engineering Economics. 2011, Vol. 22 Issue 5, p501-509. 9p. DOI: 10.5755/j01.ee.22.5.968. , Database: Business Source Complete
37	Creating sustainable small to medium enterprises through technological innovation	Thomas, AJ. PROCEEDINGS OF THE INSTITUTION OF MECHANICAL ENGINEERS PART B-JOURNAL OF ENGINEERING MANUFACTURE; MAR, 2007; 221; 3; p513-p528, Database: Science Citation Index
38	Corporate Sustainability and Innovation in SMEs: Evidence of Themes and Activities in Practice.	Bos-Brouwers, Hilke Elke Jacke. Business Strategy & the Environment (John Wiley & Sons, Inc). Nov2010, Vol. 19 Issue 7, p417-435. 19p. DOI: 10.1002/bse.652. , Database: Business Source Complete
39	The Custom Made Strategy of “Satu Kayu Desain Enterprise” in Efforting to Achieve Sustainable Competitive Advantage	Priyanto, Agus; Aslichati, Lilik; Kuncoro, Setyo. In International Conference on Small and Medium Enterprises Development with a Theme ?Innovation and Sustainability in SME Development? (ICSMED 2012), Procedia Economics and Finance. 2012 4:54-58 Language: English. DOI: 10.1016/S2212-5671(12)00320-6, Database: ScienceDirect
40	Business Process Reengineering in Motorcycle Workshop X for Business Sustainability	Budiono, Arip; Loice, Romy. In International Conference on Small and Medium Enterprises Development with a Theme ?Innovation and Sustainability in SME

Item	Title	Authors / Reference
41	The Technology, Technical Skill, and R&D Capability in Increasing Profitability on Indonesia	Chumaidiyah, Endang. In International Conference on Small and Medium
42	Positioning in the Global Value Chain as a Sustainable Strategy: A Case Study in a Mature Industry.	Albors-Garrigos, Jose; de Miguel Molina, Blanca; de Miguel Molina, Maria. Administrative Sciences (2076-3387). Jun2014, Vol. 4 Issue 2, p155-172. 18p. DOI: 10.3390/admsci4020155. , Database: Business Source Complete
43	Family Businesses in the New Economy: How to Survive and Develop in Times of Financial Crisis	Siakas, Kerstin; Naaranoja, Marja; Vlachakis, Sotiris; Siakas, Errikos. In The Economies of Balkan and Eastern Europe Countries in the Changed World (EBEEC 2013), Procedia Economics and Finance. 2014 9:331-341 Language: English. DOI: 10.1016/S2212-5671(14)00034-3, Database: ScienceDirect
44	The Industrial Networks of Taiwan's Small and Medium-Sized Enterprises	Lee, C. J.; Journal of Industry Studies, December 1995, v. 2, iss. 2, pp. 75-87, Database: EconLit
45	Supplier development programs and firm performance: evidence from Chile.	Arráiz, Irani; Henríquez, Francisca; Stucchi, Rodolfo. Small Business Economics, Jun2013, Vol. 41 Issue 1, p277-293, 17p, 7 Charts, 1 Graph. Publisher: Springer Science & Business Media B.V..
46	Implementation of sustainability management and company size: A knowledge-based view.	Hörisch, Jacob; Johnson, Matthew P.; Schaltegger, Stefan; Business Strategy and the Environment Publisher: John Wiley & Sons; , Database: PsycINFO
47	Identifying the characteristics for achieving sustainable manufacturing companies	Thomas, A.; Francis, M.; John, E.; Davies, A.. Journal of Manufacturing Technology Management, 2012, 23(4):426-440 Language: English. DOI: 10.1108/17410381211230376 , Database: Scopus®
48	SUSTAINABILITY OF THE ORGANIZATIONAL CHANGES IN THE CONTEXT OF GLOBAL ECONOMIC CRISIS	Androniceanu, A; Dragulanescu, IV. AMFITEATRU ECONOMIC; JUN, 2012; 14; 32; p365-p379, Database: Social Sciences Citation Index
49	Enhancing the competitiveness of SMEs through industrial clusters: The Indian experience.	Venkataramanaiah, S.; Parashar, S. P. International Journal of Technology Management & Sustainable Development. 2007, Vol. 6 Issue 3, p227-243. 17p. 1 Diagram, 9 Charts, 1 Map. DOI: 10.1386/ijtm.6.3.227_1.
50	Key Success Factors that Influence Knowledge Transfer Effectiveness: A Case Study of Garment Sentra at Kabupaten Sragen	Susanty, Aries; Handayani, Naniek Utami; Henrawan, Mahardian Yugi. In International Conference on Small and Medium Enterprises Development with a Theme ?Innovation and Sustainability in SME Development? (ICSMED 2012), Procedia Economics and Finance. 2012 4:23-32 Language: English. DOI: 10.1016/S2212-5671(12)00317-6, Database: ScienceDirect
51	Open Innovation Implementation to Sustain Indonesian SMEs	Hamdani, Jahja; Wirawan, Christina. In International Conference on Small and
52	The use of business information by small and medium-sized enterprises in Acornhoek.	Shokane, J K. South African Journal of Libraries & Information Science. 2003, Vol. 69 Issue 1, p55-61. 7p.
53	The New EFQM 2010 Model for Business Excellence and its Fundamental Concepts in Light of the Economic Crisis.	Kaufmann, Malte; Şerban, Viorica. Romanian Economic Journal, Jun2011, Vol. 14 Issue 40, p99-116, 18p, 2 Diagrams, 1 Chart, 1 Graph. Publisher: Romanian Economic Journal.
54	From operating efficiency to competitive edge: lessons from small firms in Botswana.	Temtime, Z. T. Strategic Change. Nov2008, Vol. 17 Issue 7/8, p295-306. 12p. 3 Charts. DOI: 10.1002/jsc.834. , Database: Business Source Complete
55	Conceptual Framework of Factors Affecting SME Development: Mediating Factors on the Relationship of Entrepreneur Traits and SME Performance	Sidik, Ignas G.. In International Conference on Small and Medium Enterprises Development with a Theme ?Innovation and Sustainability in SME Development? (ICSMED 2012), Procedia Economics and Finance. 2012 4:373-383 Language: English. DOI: 10.1016/S2212-5671(12)00351-6, Database: ScienceDirect
56	NEW PERSPECTIVES REGARDING CHANGE AND INNOVATION INTO ROMANIAN SMES.	Ceptureanu, Eduard Gabriel. Annals of the University of Oradea, Economic Science Series. 2015, Vol. 24, p117-118. 2p. , Database: Business Source Complete
57	Business sustainability: empirical evidence on	Urban, Boris; Naidoo, Reggie. Journal of Small Business & Enterprise
58	Conception of a flexible integrator and lean model for integrated management systems.	Rebelo, Manuel; Santos, Gilberto; Silva, Rui. Total Quality Management & Business Excellence, 2014, Vol. 25 Issue 5/6, p683-701, 19p. Publisher: Taylor & Francis Ltd.
59	Barrier Factors and Potential Solutions for Indonesian SMEs	Irjayanti, Maya; Azis, Anton Mulyono. In International Conference on Small and
60	Linking manufacturing improvement programs to the competitive priorities of Canadian SMEs	Lagacé, Denis; Bourgault, Mario. In Technovation. 2003 23(8):705-715 Language: English. DOI: 10.1016/S0166-4972(02)00026-3, Database: ScienceDirect
61	The sustainability of the entrepreneurial orientation--performance relationship.	Wiklund, Johan. Entrepreneurship: Theory & Practice. Fall99, Vol. 24 Issue 1, p39-50. 12p. 1 Chart. , Database: Business Source Complete
62	Sustainability and Stakeholder Management: The Need for New Corporate Performance Evaluation and Reporting Systems.	Perrini, Francesco; Tencati, Antonio; Business Strategy and the Environment, Vol 15(5), Sep-Oct, 2006 Special Issue: Sustainability Accounting. pp. 296-308. Publisher: John Wiley & Sons; [Journal Article], Database: PsycINFO
63	Development of a performance measurement framework for SMEs	Sousa, S; Aspinwall, E. TOTAL QUALITY MANAGEMENT & BUSINESS EXCELLENCE; 2010; 21; 5; p475-p501, Database: Social Sciences Citation Index
64	How to foster shared innovation within SMEs' networks: Social capital and the role of intermediaries.	Iturrioz, Cristina; Aragón, Cristina; Narvaiza, Lorea. European Management Journal. Apr2015, Vol. 33 Issue 2, p104-115. 12p. DOI: 10.1016/j.emj.2014.09.003. , Database: Business Source Complete
65	Micro-businesses need support: survival precedes sustainability.	Corporate Governance: The International Journal of Effective Board Performance. Feb2011, Vol. 11 Issue 1, p15-28. 14p. , Database: Business Source Complete

Item	Title	Authors / Reference
66	Linking manufacturing improvement programs to the competitive priorities of Canadian SMEs	Lagace, D; Bourgault, M. TECHNOVATION; AUG, 2003; 23; 8; p705-p715, Database: Science Citation Index
67	Lean Manufacturing for Sustainable Development.	By: Upadhye, Nitin; Deshmukh, S. G.; Garga, Suresh. Global Business & Management Research. 2010, Vol. 2 Issue 1, p125-137. 13p. 1 Diagram, 2 Charts. , Database: Business Source Complete
68	Customer Satisfaction Regarding Small Scale Industries Products.	Chalotra, Vipul. Amity Global Business Review. Feb2012, Vol. 7, p84-99. 16p. 10 Charts. , Database: Business Source Complete
69	From knowledge to added value: A comparative, panel-data analysis of the innovation value chain in Irish and Swiss manufacturing firms	Roper, Stephen; Arvanitis, Spyros. In Special Section on Sustainability Transitions, Research Policy. July 2012 41(6):1093-1106 Language: English. DOI: 10.1016/j.respol.2012.03.002, Database: ScienceDirect
70	Malaysia Seeks Economic Success Based on Science and Technology.	Gobble, MaryAnne M.; Gwynne, Peter. Research Technology Management. Sep/Oct2011, Vol. 54 Issue 5, p2-3. 2p. DOI: 10.5437/08956308X5405001. , Database: Business Source Complete
71	Selecting management systems for sustainable development in SMEs: A novel hybrid model based on DEMATEL, ANP, and ZOGP	Tsai, Wen-Hsien; Chou, Wen-Chin. Expert Systems with Applications. Mar2009 Part 1, Vol. 36 Issue 2, p1444-1458. 15p. DOI: 10.1016/j.eswa.2007.11.058.
72	Patterns of Innovation in Industrial Districts: An Empirical Analysis.	Muscio, Alessandro. Industry & Innovation. Sep2006, Vol. 13 Issue 3, p291-312. 22p. 10 Charts. DOI: 10.1080/13662710600858860. , Database: Business Source Complete

Table B – Participant Information Sheet (4 pages)

Participant Information Sheet

This document provides information about the research study in which you are being invited to participate. It explains what the study is about, the purpose, the benefits and/or risks you may have as participant, and confidentiality of your participation, if you elect to join the study.

Title of Study

Business sustainability for SMEs operating in high cost regions

Version Number and Date

INSH160428 – 28 April 2016 – (Please see latest changes in ***italic-bold***)

Invitation to form part of the research study

You are being invited to participate in a research study about how small and medium-sized enterprises (SMEs) that operate in high-cost regions such as southern California, decided which business sustainability approaches to adopt. By participating in this study, if you elect to do so, you will be helping SMEs in high-cost regions to learn which factors could have an impact on business sustainability. If we effectively can inform SMEs how their decisions could affect their business sustainability, it might help them become more resilient in the market place.

What is the purpose of the study?

The main objectives of this research are to learn how small and medium-sized enterprises (SMEs) select business sustainability approaches that successfully make it difficult for Multi-National Corporations (MNCs) to replace them as suppliers, and why SMEs select specific approaches over other alternative approaches, and how this impacts their ability to be financially sustainable.

Prof. Andrew Lyons, Information Sheet Munoz, 28/Apr/16

approaches, we will go over the participant consent form, and the process I will follow to ensure your identity is kept confidential. I plan to use an audio recorder to enhance my ability to accurately describe your responses and comments. This recording will be only accessible by my research supervisor, Professor Andy Lyons, as a way to confirm that the transcription of our discussion is accurate. This recording will not be available to anyone in your organization.

Role of researcher and relationship with participants

The researcher and research participants' relationship will be one of interviewer and interviewee, respectively. No previous relationship must exist between the researcher and the participants, in order to avoid any bias that can surface due to this relationship. The researcher will conduct interviews by formulating questions related to the study research objectives following a case protocol. The interviews will be conducted with a semi-structured approach to allow as much liberty and freedom to the interviewees to express their experience and concerns related to financial business sustainability. The researcher will use various high-level questions to guide the thought process during the interview and ensure that the main objectives are achieved. The researcher will take notes, while also audiotaping the conversation, to ensure that the answers and comments during the interviews are collected as precisely and accurately as possible, reflecting the interviewee opinion and understanding. The person conducting the site tour, which is one of the elements of the research process, will have no prior business relationship with the researcher.

Expenses and / or payments

No payments will be made to any participant or company involved in the proposed research study. No expenses are expected to be incurred by the participants of the research process. The company will incur expenses associated with the time allowed for the interviews, the gathering of documents and the facility tour. However, it is planned to undertake these activities in the normal operations time to minimize the cost to the organization. The researcher will incur travel expenses, including transportation, meals and lodging, as required to access the organization facility. These will be self-funded, as no organization will be required to pay for the researcher's expenses.

Are there any risks in taking part?

There are no risks anticipated for your participation in this research. The two key aspects that could be of concern, such as confidentiality and personal safety, will be addressed as follows. Confidentiality it will be addressed in the section below ("Will my participation be kept confidential?"). With regard to safety, we will follow your company's policy for safety and the use of protective equipment. In the event you or I feel that we are in an unsafe situation, we will suspend the research study and resume later, as appropriate, when the safety concern has been resolved.

Are there any benefits in taking part?

The personnel that elect to participate in the research will be invited to an 8-hour seminar on business sustainability approaches. The seminar will include different aspects of business sustainability such as Lean Manufacturing, Six Sigma, Value Analysis/Value Engineering, Theory of Constraints, or Supply Chain Management. The seminar will be tailored based on the needs and preferences of the audience. This seminar is intended to help you and your organization to acquire new skills in business sustainability approaches, which can help you and your organization to improve your profitability and the ability to become more resilient to market conditions.

What if I am unhappy or if there is a problem?

If you are unhappy, or if there is a problem, please feel free to let us know by contacting the researcher's supervisor Professor Andrew Lyons by calling 00 44 151 795 3608 or e-mail at a.c.lyons@liverpool.ac.uk and we will try to help. If you remain unhappy or have a complaint which you feel you cannot come to us with then you should contact the Research Governance Officer at ethics@liv.ac.uk. When contacting the Research Governance Officer, please provide details of the name or description of the study (so that it can be identified), the researcher(s) involved, and the details of the complaint you wish to make.

Will my participation be kept confidential?

Yes. Your participation will be kept confidential. The information you provide will be summarized and used under a coded name to ensure no connection to your company or your name. Any quote to be included in the study will be approved by the source prior to the final report being submitted to the University for evaluation.

Prof. Andrew Lyons, Information Sheet Munoz, 28/Apr/16

Only if you elect so, your name will be used during the final report as a means to give you credit for the support during the research process. *This will only be done if you provide a written consent to include your name as reference.*

What will happen to the results of the study?

The results of the study are intended to be part of the Thesis for a Doctor in Business Administration degree, which the researcher is pursuing. Upon the completion of the doctoral degree requirements, the researcher plans to write an article to share the learning with a wider audience interested in business sustainability.

What will happen if I want to stop taking part?

At any time, you, the interviewee, can stop your participation in the research process. No reason or justification needs to be provided as this is a voluntary process.

Who can I contact if I have further questions?

The thesis supervisor, Professor Andy Lyons, will be overseeing the research process. If there are any questions or concerns related to the research process, you are welcome to reach him at:

e-mail: a.c.lyons@liverpool.ac.uk

phone: 0151 795 3608

Table C – Participant Consent Form

Committee on Research Ethics

PARTICIPANT CONSENT FORM

Title of Research Project:	Business sustainability for SMEs operating in high cost regions	
Researcher(s):	Jose Munoz-Gonzalez and Prof. Andrew Lyons	**Please initial box**
1. I confirm that I have read and have understood the information sheet dated 28 April 2016 for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.		
2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason, without my rights being affected. In addition, should I not wish to answer any particular question or questions, I am free to decline.		
3. I understand that, under the Data Protection Act, I can at any time ask for access to the information I provide and I can also request the destruction of that information if I wish.		
4. I agree to take part in the above study.		

Participant Name **Date** **Signature**

Name of Person taking consent **Date** **Signature**
Jose Munoz-Gonzalez

Researcher **Date** **Signature**
Jose Munoz-Gonzalez

Principal Investigator:
Name
Work Address
Work Telephone
Work Email

Student Researcher:
Name Jose Munoz-Gonzalez
Work Address
Work Telephone 1-630-414-6542
Work Email jose.munoz-gonzalez@my.ohecampus.com

[v03 28/4/'16]

Optional Statements

- The information you have submitted will be published as a report; please indicate whether you would like to receive a copy.
- I understand that confidentiality and anonymity will be maintained and it will not be possible to identify me in any publications.
- I agree for the data collected from me to be used in future research and understand that any such use of identifiable data would be reviewed and approved by a research ethics committee.
- I understand and agree that my participation will be audio recorded and I am aware of and consent to your use of these recordings for the following purposes: To ensure accuracy of the information being summarized or stated during the thesis final report.
- I understand that I must not take part if at any time I want to withdraw for any reason.
- I agree for the data collected from me to be used in relevant future research.
- I would like my name used and I understand and agree that what I have said or written as part of this study will be used in reports, publications and other research outputs so that anything I have contributed to this project can be recognised.
- I understand that my responses will be kept strictly confidential. I give permission for members of the research team to have access to my anonymised responses. I understand that my name will not be linked with the research materials, and I will not be identified or identifiable in the report or reports that result from the research.
- I understand and agree that once I submit my data it will become anonymised and I will therefore no longer be able to withdraw my data.

Table D – Case Studies Questionnaire

Research Study: Business sustainability for SMEs operating in high cost regions

Case Study Guide - Questions

Participant Name:
Date:

Questions	Answers	Remarks / Comments
1.3.1 Operational Effectiveness		
1.3.1.1 Describe the major challenges your organization faces (Threats, Weakness and Opportunities).		
1.3.1.2 How does your business strategy is aligned to address these challenges and how it ties to business sustainability?		
1.3.1.3 How do you create flexibility to address changing customers, markets and government demands?		
1.3.1.4 How do you manage cost?		
1.3.1.5 How do you create and measure knowledge in the organization? What is the level of education of your leadership team?		
1.3.1.6 What is innovation for you and how critical it is for your business? How do you determine the level of innovation needed for being successful in the market place?		
1.3.1.7 How do you communicate internally and externally? How you measure the effectiveness of the communication?		
1.3.1.8 How do you share information upstream and downstream the supply chain? How frequent and how extensive?		
1.3.1.9 How do you integrate your process and products with your customers or suppliers? How effectively you use lock-in mechanism with customers (i.e.; VMI and Customization)?		
1.3.2 Business Sustainability Approaches		
1.3.2.1 Explain your understanding of business sustainability approaches such as Lean Manufacturing, Six Sigma, Sourcing/Negotiation, Value Analysis/Value Engineering (VA/VE), Theory Of Constraint (TOC), etc.		
1.3.2.2 How did you learn of these business sustainability approaches?		
1.3.2.3 Describe the business sustainability practices your organization follows. Provide examples (researcher to confirm with observations during the tour, if possible).		
1.3.2.4 Explain the impact of these business sustainability approaches to your business. Link impact to business results, including metrics.		
1.3.2.5 Why did you chose this/these business sustainability approach(es)? Alternatively, Why are you not practicing any business sustainability approach?		
1.3.2.6 How these business sustainability approaches help you address your business challenges?		
1.3.2.7 How did you learn of these business sustainability approaches?		
1.3.2.8 Why have you not tried other business sustainability approaches?		
1.3.2.9 How else do you create business sustainability?		

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